ROADS AND STREETS

MAY 1946

High Speed Spreading on TIMKEN BEARINGS

TECHNOLOGY DEPT:

Spreading full capacity loads at top speed is an important advantage of Wooldridge Terra Cobra Scrapers stressed by the Wooldridge Manufacturing Company; contributing factors include the use of Timken Tapered Roller Bearings in all wheels which, by eliminating friction; increasing wheel stability; and holding wheels constantly in alignment help to provide great maneuverability under all conditions of terrain, speed and load.

But Timken Bearings do even more; through their tremendous load-carrying capacity — radial loads, thrust loads or both together in any combination — they greatly increase equipment endurance and reduce maintenance. When the Terra-Cobra is fully loaded, approximately 40 tons of steel and earth are moving along at 21 m.p.h. on Timken Bearings.

Any kind of construction machinery equipped with Timken Bearings can be expected to be available for service a greater part of the time; last longer; and cost less for operation and upkeep. To be sure of getting these advantages in your machines, make sure the trade-mark "TIMKEN" appears on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

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DETROIT

Tapered Roller TIMKEN BEARING EQUIPPED

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

45 SECONDS DOES IT WITH ADAMS

From Ditch Cuts To Bank Cuts Without Mechanical Adjustments

★ **It's a fact!** With Adams Motor Graders you shift from ditch-cutting to bank-cutting positions (or vice versa) *in just 45 seconds—with blade centered on circle—without changing "average" setting of telescopic blade lift links.*

The importance of this advanced Adams feature can hardly be exaggerated. It means that positive power-operated blade controls accurately place the blade in virtually any desired position—*without stopping grader—without operator leaving his seat.* This spells *faster operation—better work—more work per day.*

Model for model, Adams are the world's most versatile and useful motor graders—designed and built to do all types of grading just a little faster, easier and better than any others. That's why, wherever speed, power, efficiency and economy are premium factors, you'll find Adams Motor Graders the outstanding favorites.

For complete facts on all models, see your local Adams dealer, or write company direct.

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, IND.

ADAMS

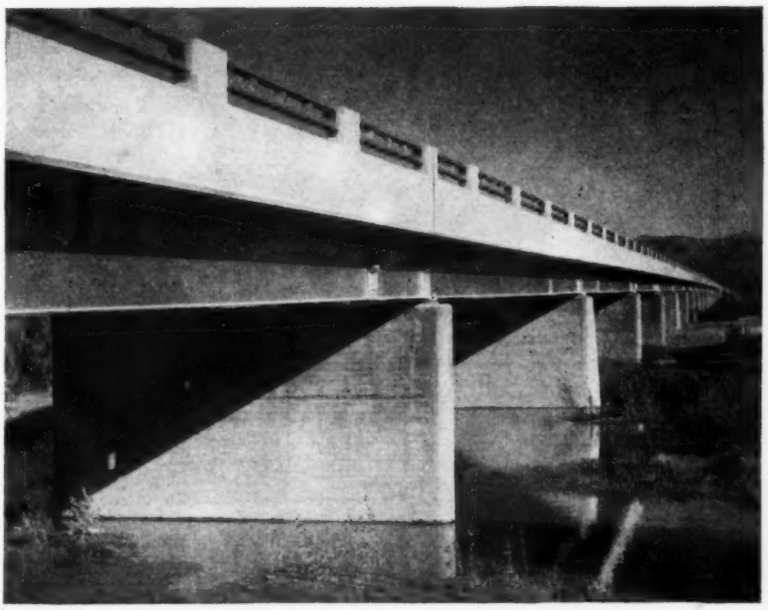
ROAD BUILDING AND EARTH-MOVING EQUIPMENT

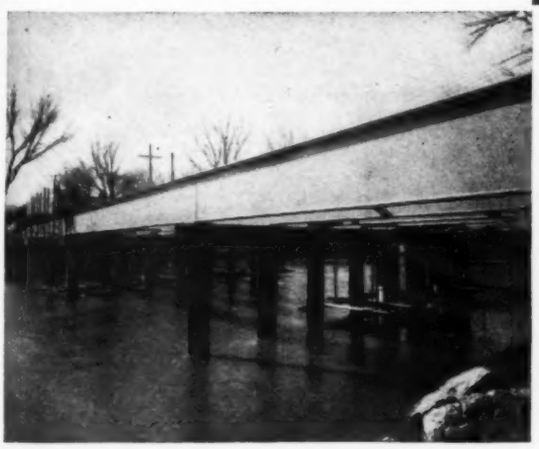
TECHNOLOGY DEPT.

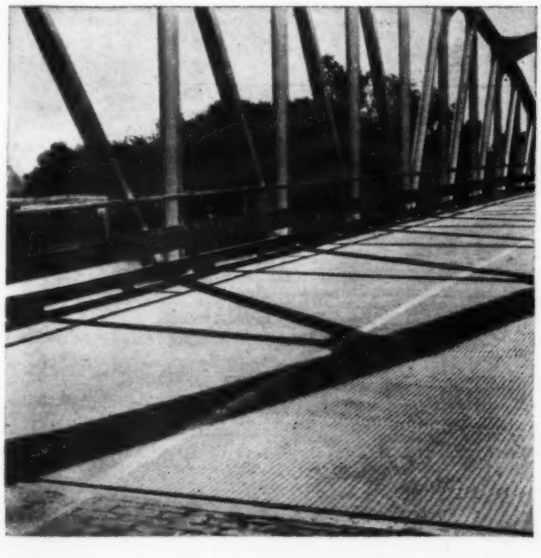
STEEL for Highway Bridges by BETHLEHEM

What are your needs in highway bridge-building? Whether it's to be an all-steel bridge, or reinforced concrete, or concrete-and-steel, Bethlehem can supply all the steel that the designs require.

Structural steel... reinforcing bars... reinforcing trusses... steel "Battledeck Floor"... single and multiple-strand bridge cable and suspender wire ropes... steel-sheet piling and steel H-piling... these and many other steel products for bridge-building are available through the nearest Bethlehem district office, or through Bethlehem Steel Company, Bethlehem, Pa.







STEEL SHEET PILING

There are many applications for Bethlehem Steel Sheet Piling in the construction of highway bridges. Use it in temporary cofferdams, in the construction of bridge foundations, and in abutments and retaining walls. This piling is rolled in a wide range of sections, including straight, arch and deep-web, and Z-type sections.

STEEL H-PILING

Steel H-Piles have high column strength. They are used to best advantage in locations where they can be driven into hard ground material such as hard-pan or shale or to firm bearing on solid rock. In such cases extremely high bearing capacities can be developed.

Bethlehem Steel H-Piles are special wide-flange structural steel shapes having web and flanges of the same thickness. They are used in bridge foundations in the same manner as other types of bearing piles.

"BATTLEDECK FLOOR"

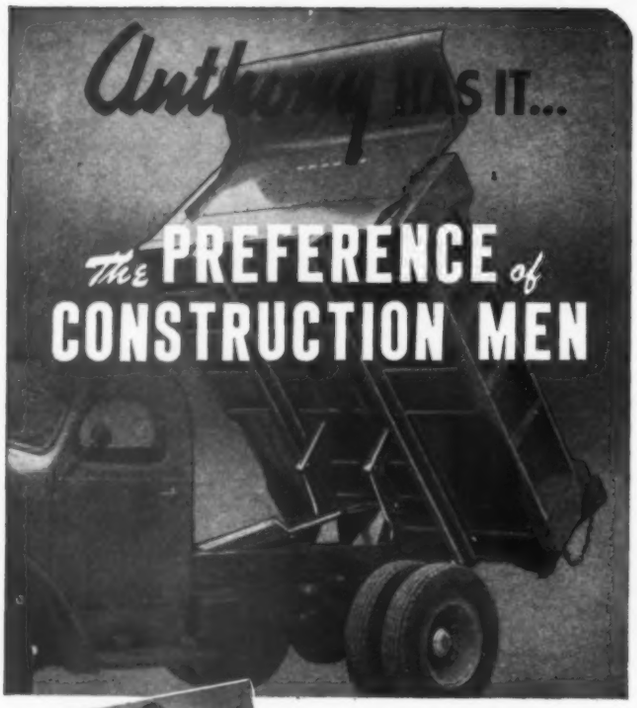
Steel "Battledeck Floor" is as light as timber but more durable than concrete. Where traffic is heavy or the bridge span of considerable length, the weight of the flooring will naturally be an important factor in the cost of the steel structure required to carry it. In such cases "Battledeck Floor" should be given full consideration.

"Battledeck Floor" has an advantage over other steel floors designed for lightness in that it is not composed of thin sections. It consists of standard rolled beams, placed lengthwise of the traffic, with a flat plate of substantial thickness welded over these beams. It is therefore assured of a life as long as that of the bridge which supports it.

Send Today for New Highway Steel Catalog

Bethlehem's new illustrated catalog, "Steel for Highways," gives complete information about Bethlehem road-steel products. Send for a copy today. Ask for Catalog 191, and address the nearest Bethlehem district office, or Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL



BODY EQUIPMENT

For Every Job

Experienced truck equipment dealers know the evident preference construction men have for Anthony body equipmnt and cash in on it. It means extra, easier sales. Pictured, top to bottom:

- *Anthony "Super" Hydraulic Hoists and Dump Bodies.* From 5 to 30 ton, for conventional and C. O. E. 6-wheelers and semi-trailers.
- *Anthony Hydraulic Lift Gates* open up an entirely new and profitable market for you.
- *Anthony Agricultural and Material Spreaders,* built to automotive standards. All steel, opened up to 40' widths.
- *Anthony Hydraulic "Booster" Hoists,* especially designed to make dump bodies out of platform trucks. Every farmer a prospect.

Write for complete details on any Anthony product. Available for installation, and serviced through all Anthony distributors.

STREATOR, ILLINOIS ANTHONY COMPANY

ROADS AND STREETS

No. 5 MAY, 1946 Vol. 89

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A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD ROADS MAGAZINE AND ENGINEERING & CONTRACTING

HALBERT P. GILLETTE, President; EDWARD S. GILLETTE, Publisher; HAROLD J. McKEEVER, Editor; CHARLES T. MURRAY, Managing Editor; H. K. GLIDDEN, Eastern Editor (N. Y.); LT. COL. V. J. BROWN, Publishing Director (Absent on Military Duty); H. J. CONWAY, Advertising Editor; L. R. VICKERS, Promotional Director.

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Thew · LORAIN does it again!

It's New

★ in Ideas
★ in Design
★ in Features
★ in Performance

AND WE DO MEAN NEW!

The TL-20 is the first really new "postwar" shovel and crane—not a delayed prewar unit, not a war-built unit—but new and up-to-the-minute from mounting to boom head.

True, all basic functions are the same. It hoists, swings, travels and crowds. But the way it does these jobs is entirely new—in engineering design, in power, speed and output.

A COMPLETE PACKAGE—NO EXTRAS!

Each TL-20 is a complete package. All essential accessories—such as starter, generator, lights—are built into the standard unit. It's not a stripped-down unit; no "extras" to buy. It has the largest number of interchangeable parts ever built into a machine.

UNIT ASSEMBLY THROUGHOUT!

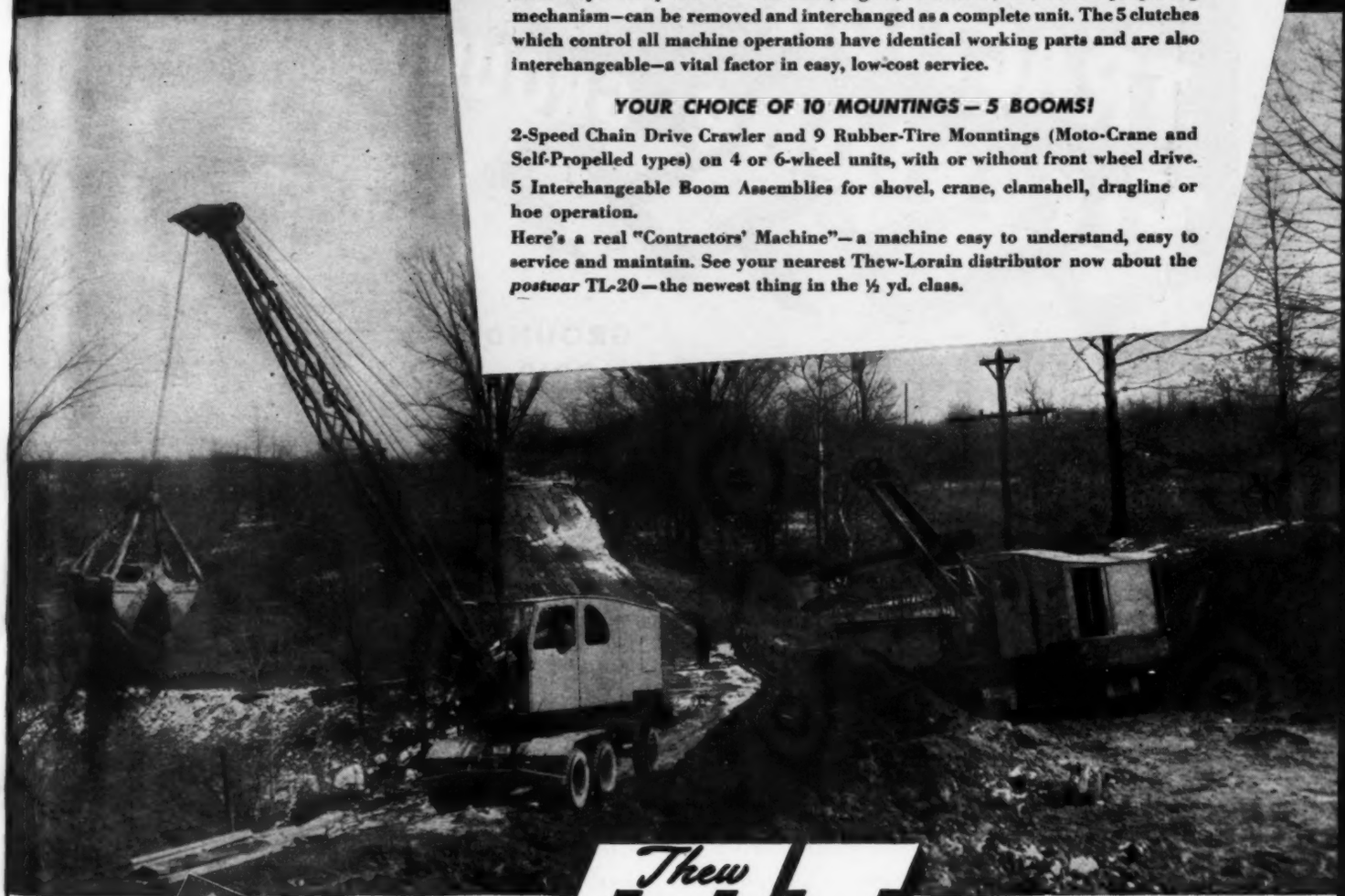
Each major component—clutch shaft, engine, hoist shaft, cab, crawler propelling mechanism—can be removed and interchanged as a complete unit. The 5 clutches which control all machine operations have identical working parts and are also interchangeable—a vital factor in easy, low-cost service.

YOUR CHOICE OF 10 MOUNTINGS—5 BOOMS!

2-Speed Chain Drive Crawler and 9 Rubber-Tire Mountings (Moto-Crane and Self-Propelled types) on 4 or 6-wheel units, with or without front wheel drive.

5 Interchangeable Boom Assemblies for shovel, crane, clamshell, dragline or hoe operation.

Here's a real "Contractors' Machine"—a machine easy to understand, easy to service and maintain. See your nearest Thew-Lorain distributor now about the *postwar* TL-20—the newest thing in the ½ yd. class.



FREE... and full of facts

The complete, illustrated story on the TL-20 is contained in this bulletin. Ask your Thew-Lorain distributor for a copy or write Thew Shovel Co. direct.

Thew TL-20 Lorain

THE THEW SHOVEL CO.
LORAIN, OHIO

Available with 5 Interchangeable Booms and Choice of 10 Mountings

GROUND GRIP

WHEN other tires quit — gum-up and spin — the Firestone Ground Grip keeps driving — maintains maximum traction in loose fill or over unimproved haul roads. Specifically designed for the drive wheels of earth-moving trucks and equipment, this special purpose tire has proved itself to be the greatest traction tire ever developed for off-the-highway work. The connected triple-braced tread bars pack down loose earth as they dig into the ground. Flexing action of the continuous tread design forces dirt from between the tread bars — keeps them clean, ready for the next traction bite.

Firestone Ground Grips on the drive wheels of your off-the-highway equipment out-pull any other tire ever built, cut your operating time — and costs — to the minimum.

For the best in music, listen to the "Voice of Firestone" every Monday evening over NBC network.

ALL NON-SKID
Designed to give maximum flotation to free-rolling wheels on drawn earth-moving scrapers, wagons and buggies.

ROCK GRIP EXCAVATOR
Delivers extra traction plus stamina in toughest trucking operations, quarrying, logging, construction work, ore and coal strip mining.

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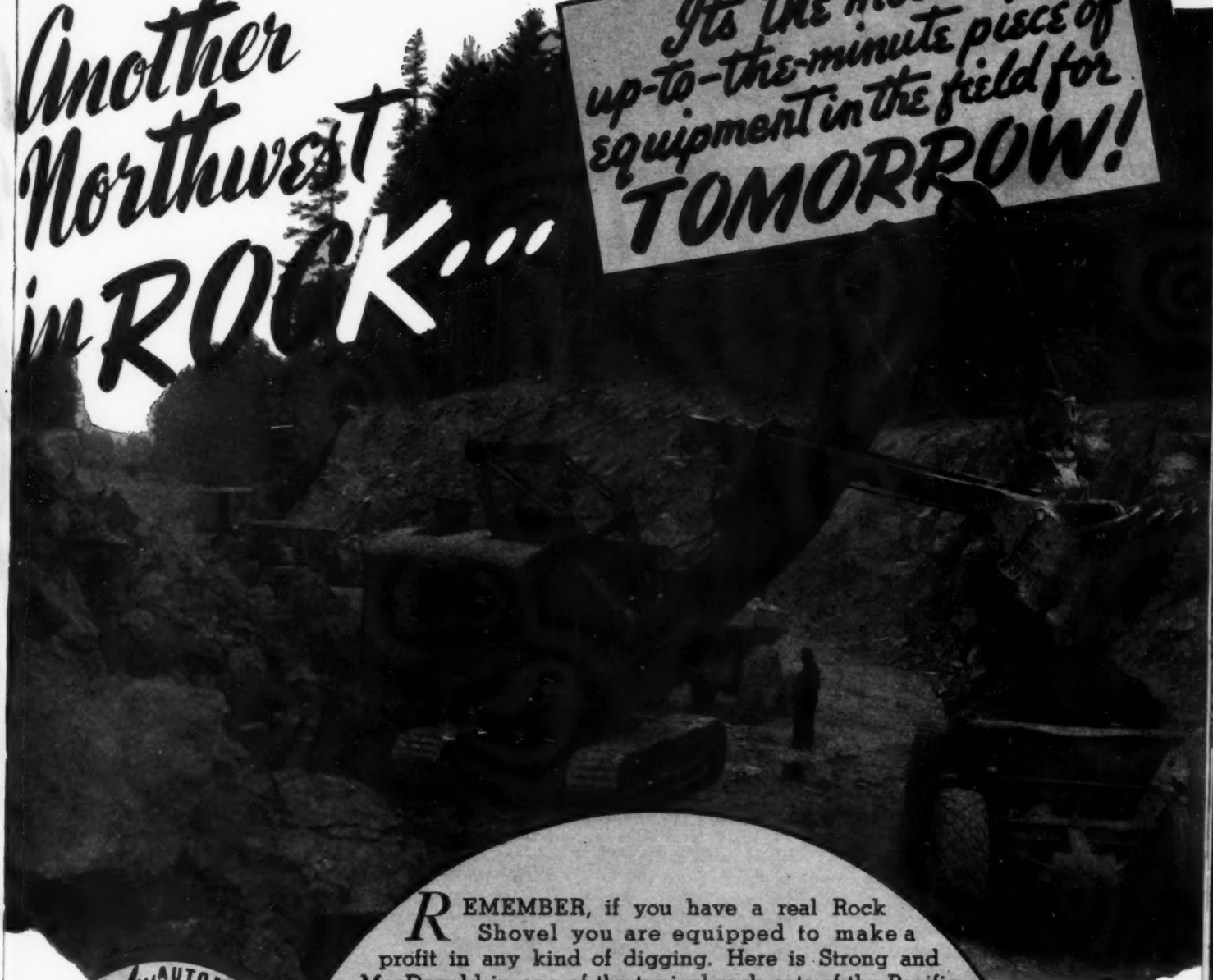
Firestone OFF-THE-HIGHWAY TIRES

Another Northwest in ROCK...

It's the most up-to-the-minute piece of equipment in the field for TOMORROW!



INDEPENDENT CROWD plus AUTOMATIC CROWD
FOR GREATER DIGGING POWER
The DUAL CROWD

REMEMBER, if you have a real Rock Shovel you are equipped to make a profit in any kind of digging. Here is Strong and MacDonald in one of the typical rock cuts of the Pacific Highway — 336,000 cu. yds. of excavation — virtually all of it rock. Any machine that can slug into this kind of digging hour after hour, day after day, will find other types of digging easy.

That is the kind of shovel ability you are going to want — the kind of shovel ability you are planning for on those coming jobs.

With the Northwest Dual Independent Crowd and the Northwest Welded Shovel Boom, the "Feather-Touch" Clutch Control that assures easy operation, yet permits the feel of the load, the Cushion Clutch and Uniform Pressure Swing Clutches, and other Northwest advantages you have a real Rock Shovel! If you have a real Rock Shovel you can make a profit in any digging.

We'll be glad to send you details on the type and size machine you are interested in for your future plans.

NORTHWEST ENGINEERING COMPANY
1727 Steger Building, 28 E. Jackson Boulevard, Chicago 4, Illinois

NORTHWEST

SHOVELS • • CRANES • • DRAGLINES • • PULLSHOVELS

—and when you have a real Rock Shovel you won't have to worry about output in dirt

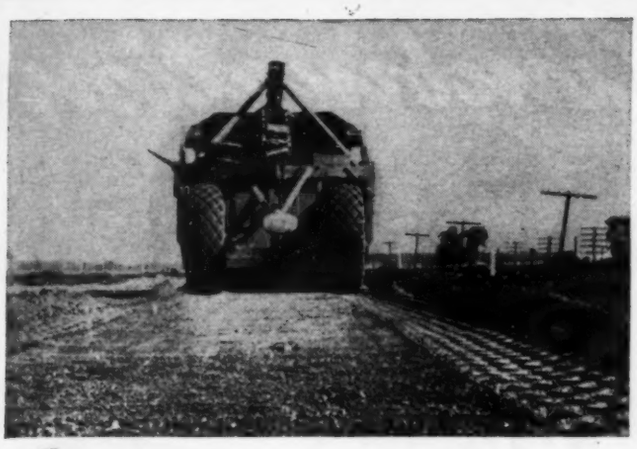
YOU CAN PROFITABLY HANDLE *All these materials* WITH TOURNAPULLS

Shale To strip 3' of shale and 18' of clay from a 54-acre Alabama coal mine, contractor S. R. Batson Co. used 2 Super C Tournapulls. 15 heaped yards are loaded in 75 to 85 feet in one minute. Tournapulls travel up 150' of 10% grade and 250' of 6% grade on average 800' one-way haul. Production is 3,000-yards-and-over every 10 hours according to Mr. Batson, who states that, in two months of operation, they have had only two hours down time.

Mud 3 Tournapulls moved mud during "shut-down" conditions for Grantwood Const. Co. on 110,000-cu. yd. land leveling job near St. Louis, Mo. Springs seeping out of hillside kept water standing in the cut. Fill was placed in a swamp. Tournapulls kept working because their big 21.00 x 24 tires gave ample flotation to stay on top of soft ground; correct ratio of weight to h.p., plus 2-wheel prime mover design, gave plenty of traction and power.

Rooted Rock 5 Tournapulls loaded tight, rocky hardpan for Leonard & Slate on 2½-mile, 636,000-yard section of U.S. 99 north of Woodland, Wash. Each rig averaged 55 pay yards per hour on a 4600' round trip haul over 18 to 20% return grades, plus delays entering heavy traffic stream for haul on main highway. Tournapulls handle broken shale, decomposed granite, crushed stone, hardpan . . . or any material a Rooter can break loose.

FOR LOWEST NET COST PER YARD



Gravel Raemisch-Madden Co. used part of their fleet of 11 Tournapulls to load, haul and spread 47,000 cu. yds. of sub-base on U.S. 66, near Chenoa, Ill. Loading wet, pit-run gravel, hauling over pavement, spreading 4 to 6" lifts under rigid state engineer inspection, each rig delivered 25 pay yards per hour on 6-mile round trip. This method eliminated conventional shovel loading, truck hauling and spreader boxes.

Clay Working in typical Iowa gumbo, Peter Kiewit Sons Co. used 6 Tournapulls on their 2,300,000-yd. Rock Island rail relocation job, near Eldon, Iowa. Loading soft, sticky clay out of a 22' cut, material was spread on an 18' fill at bottom of a steep, slick grade. High apron lift, plus positive ejection tailgate cleared each load from the Carryall bowl; big-tired, 2-wheel traction gave plenty of pull through the soft fill and up slippery grade.

C36 X

Sand "Nothing like Tournapulls to move this sand," says J. M. Jones, Sup't. of Claussen-Dunn Const. Co. on their 300,000-yd., 3-mile Georgia highway job. Material is loose, dead sand. Two Tournapulls pumped capacity loads up to the spring pipe in 2½ minutes; each rig averaged a 9000' round trip every 10 minutes, with travel through 7,800' of traffic on black-top. Rain kept other haul units out of pit for two days, didn't stop Tournapulls.

Investigate Tournapull profit possibilities on YOUR dirt-moving. Get cost and production estimates from your LeTourneau Distributor!

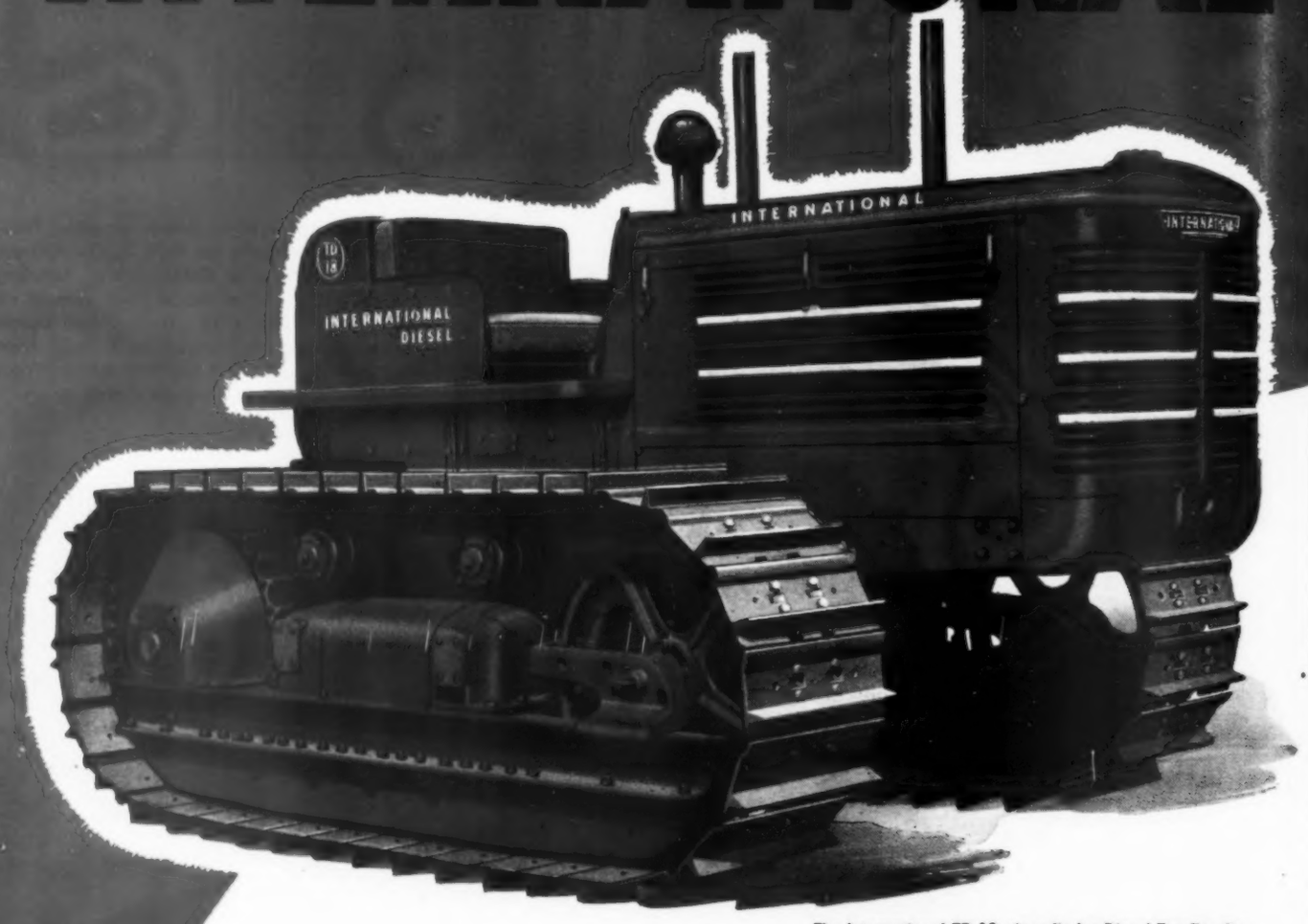
Manufacturers of Tournapulls*, Angledozers*, Bulldozers, Tiltdozers*, Carryall* Scrapers, Power Control Units, Rooters*, Tournatrailers*, Tournacranes*, Tournatrucks*, Sheep's Foot Rollers, Tournarope*, Tournaweld*, Tournalifts*. * Trade Mark Reg. U. S. Pat. Off.

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

The Best Combination-

INTERNATIONAL



The International TD-18, six-cylinder Diesel TracTracTor. This power-packed crawler will take all the punishment your toughest jobs can give it! Low cost for fuel—minimum maintenance—ruggedness that assures long-lived service in powering the construction jobs of today and tomorrow—backed by International Harvester's world-wide service organization.

TracTracTors
AND *the Finest* OF MATCHED EQUIPMENT

ONE outstanding advantage in buying International Tractors for any power application is the excellence of perfectly matched equipment available for use with them. Through International Industrial Power distributors you have available the 'dozer blades and other earth-moving tools that are best adapted to construction operations at your locations.

Thus, you have the best combination for profitable operations: (1) the unbeatable operating economy of power-packed International Crawlers and (2) the finest of time-tested and job-proved equipment, matched in work capacity to the horsepower of International Tractors.

Consider the many superior features of International TracTracTors, such as:

- Instant-starting, *full Diesel* engines with advanced design fuel injection that assures complete fuel combustion—
- Ball-bearing and roller-bearing power transmissions that deliver maximum engine horsepower to the tracks—
- Accessible and replaceable clutches, brakes, transmission and other assemblies—

Then you know that International Tractors plus the finest of matched equipment makes the best combination for greater profits through peak performance.

See your International Industrial Power Distributor for all the facts about International Tractors, Power Units and matched equipment now available. There's a size and type of International Tractor exactly suited to your operations.

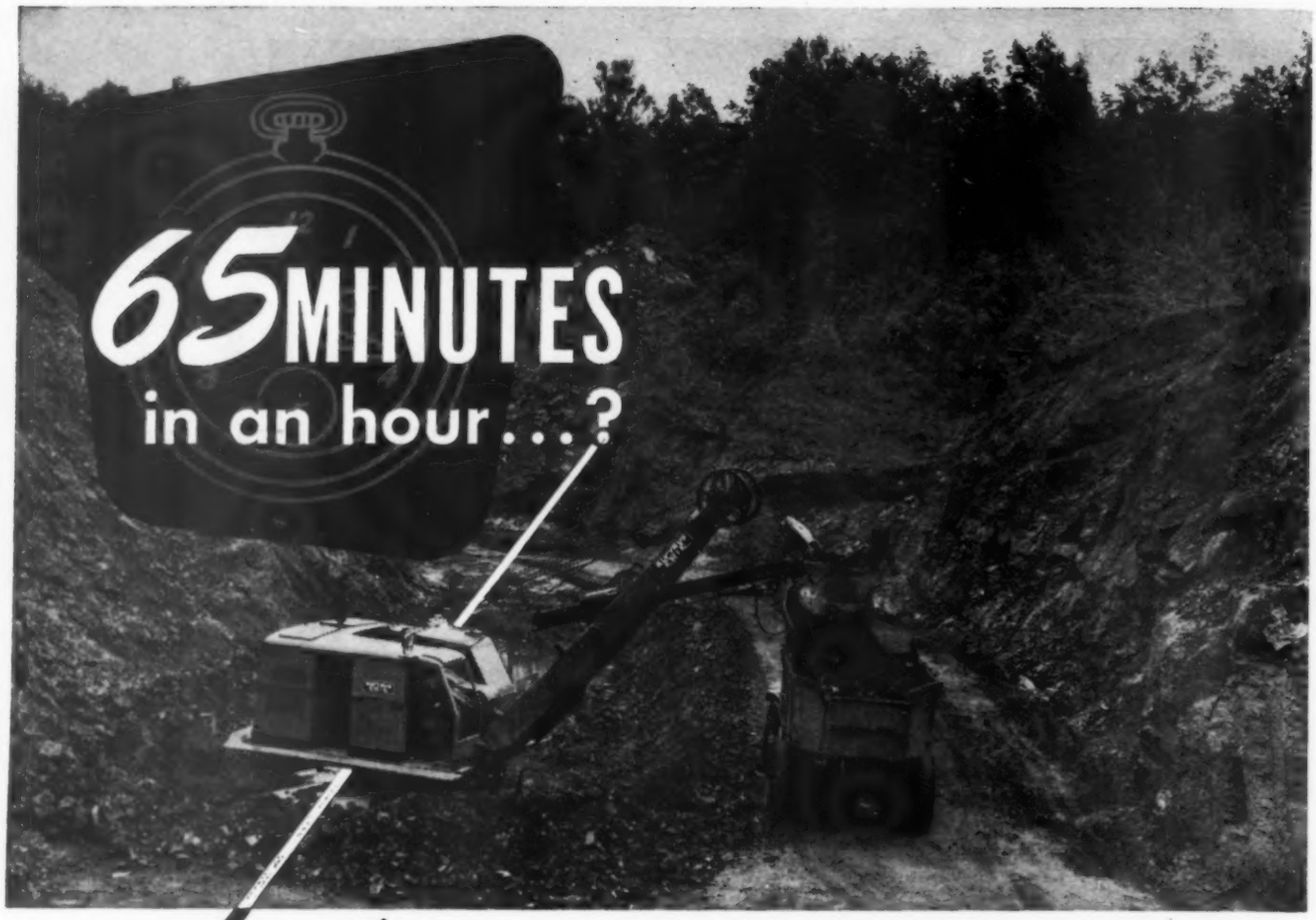
Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue **Chicago 1, Illinois**

Dependable after-sale service is provided all owners of Internationals by distributors and dealer organizations that span the continent and circle the globe. Factory replacement parts and equipment built for use with International Tractors and Power Units are available through these organizations. This assures maximum value and long term benefits for owners and operators everywhere.

INTERNATIONAL Industrial Power



Obviously, ...no

ADJUSTMENTS, because they are all easy to make and last once you make them;

MAINTENANCE, because machinery arrangement is simple and accessible, and because balanced minimum-stress performance means few repairs;

LUBRICATION, because fittings are easy to reach, difficult to overlook;

MOVES, because the simple, efficient caterpillar mounting and the easy steering combine to permit fast maneuvering on the job;

But by taking advantage of the extra working time you get every hour of every shift with Bucyrus-Erie ⅜- to 2½-yard excavators, and measuring time in terms of output, you get a similar effect. With Bucyrus-Eries you "expand" each hour by saving time on:

OPERATING, because the controls give "full feel," are easily operated, and are all conveniently grouped so that the operator does not need to leave his position.

That means more time to put to work really outstanding digging ability — the result of design that combines the best performance features developed in Bucyrus-Erie's long experience in manufacturing excavators. Quickly convertible in the field, Bucyrus-Eries are equally effective as shovels, draglines, clamshells, or cranes.

you make the most of EVERY HOUR with a BUCYRUS-ERIE

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

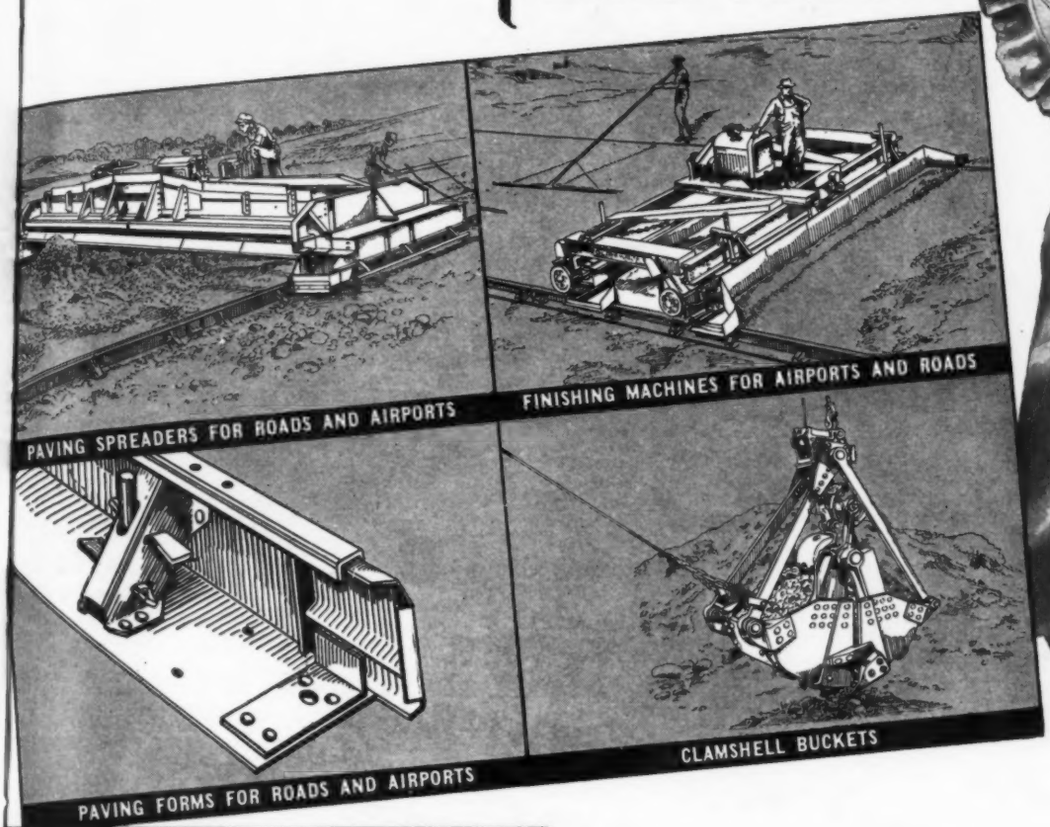
05E46

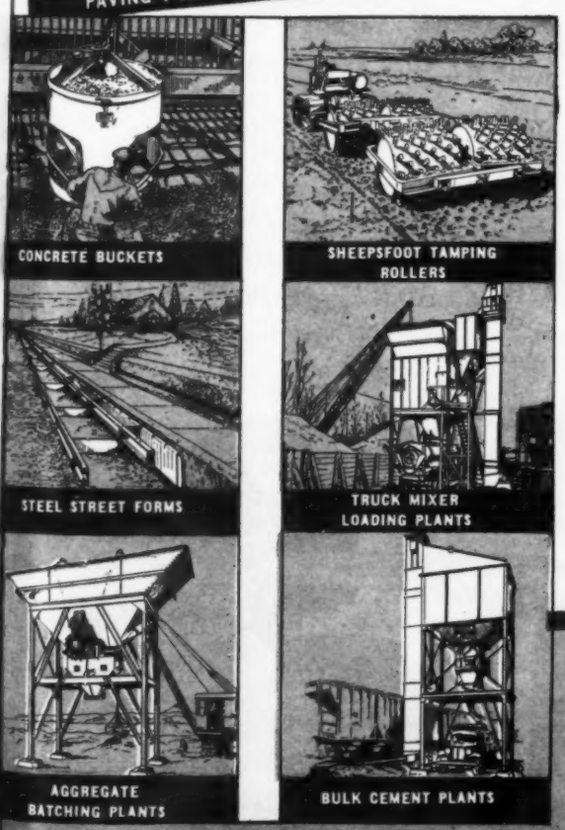
BLUE RIBBON PERFORMANCE MEANS

Record Smashing Production

High Quality Performance

Lower Costs and Greater Earnings


PAVING SPREADERS FOR ROADS AND AIRPORTS
FINISHING MACHINES FOR AIRPORTS AND ROADS
PAVING FORMS FOR ROADS AND AIRPORTS
CLAMSHELL BUCKETS



Blaw-Knox Construction Equipment offers all three!

Where high speed construction is imperative, either to meet a tough schedule or to make up for unforeseen delays, you can bank on Blaw-Knox Equipment getting the job done quicker.

Where quality of work has to satisfy the requirements of rigid inspection, the Blaw-Knox equipped contractor can depend on his machinery.

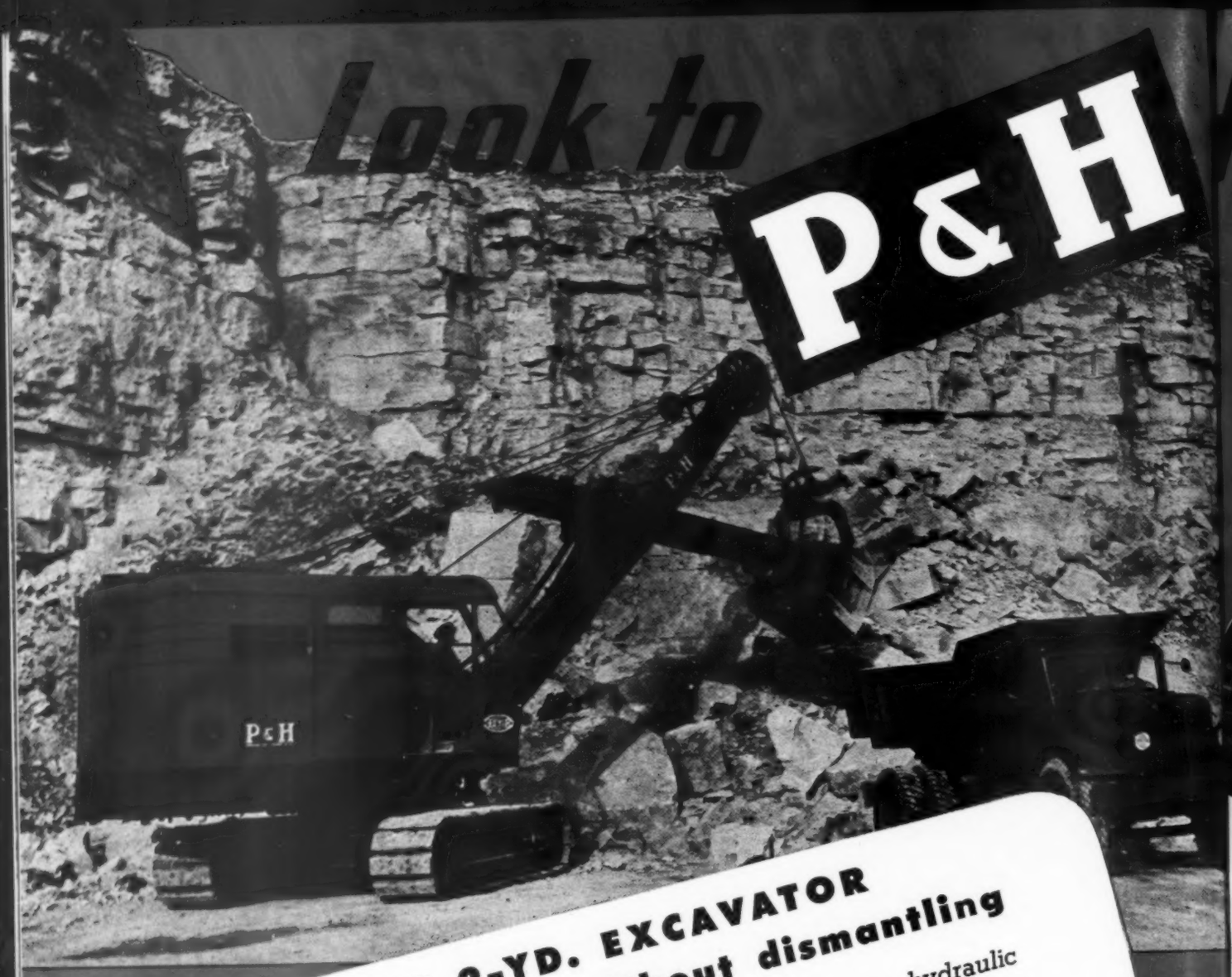
Earlier completion and high quality performance through the use of Blaw-Knox Construction Equipment mean cost reduction and larger profits.

The features you are looking for — the factors that mean **Blue Ribbon Performance** — are built into Blaw-Knox batchers and forms, buckets, spreaders and finishers, etc. Experience of our armed forces overseas, and of contractors everywhere, bears this out.

For details — photos — performance data, write for Bulletin No. 2036.

BLAW-KNOX DIVISION of Blaw-Knox Co.
2003 Farmers Bank Bldg. Pittsburgh 22, Pa.

BLAW-KNOX
CONSTRUCTION EQUIPMENT



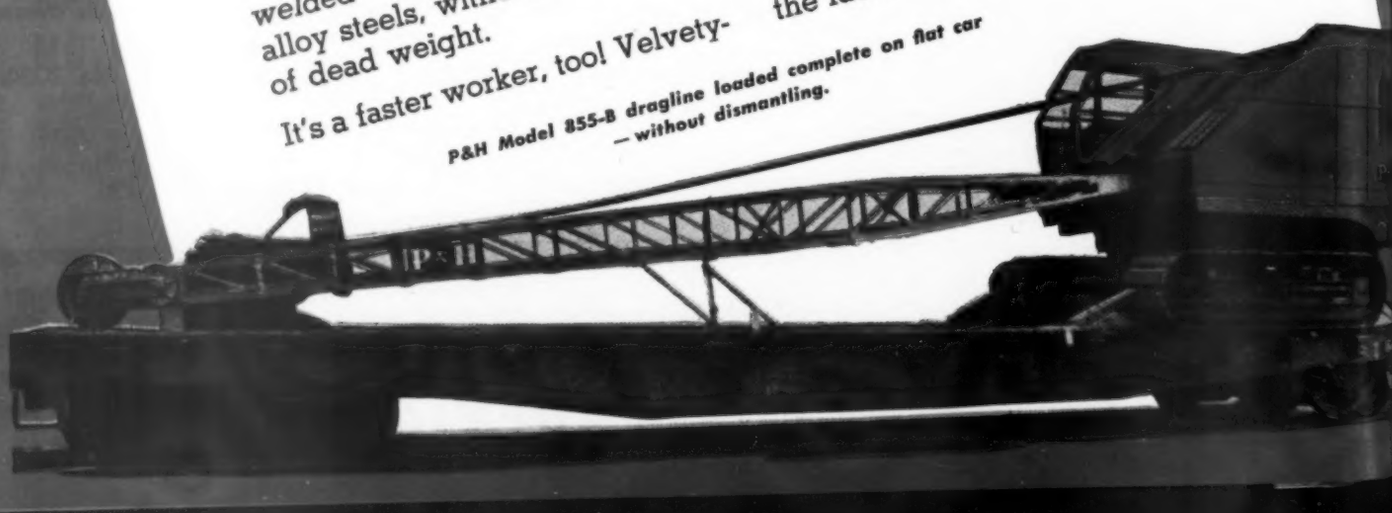
THIS 2-YD. EXCAVATOR can be shipped without dismantling

P&H Model 855-B! A full 2-yd. machine that's much easier to transport. You don't have to dismantle and re-assemble when you change job locations.

In addition, it's husky, compact, welded throughout of rolled alloy steels, without the penalty of dead weight.

It's a faster worker, too! Velvety-smooth low pressure hydraulic control is more responsive, more accurate, more dependable.

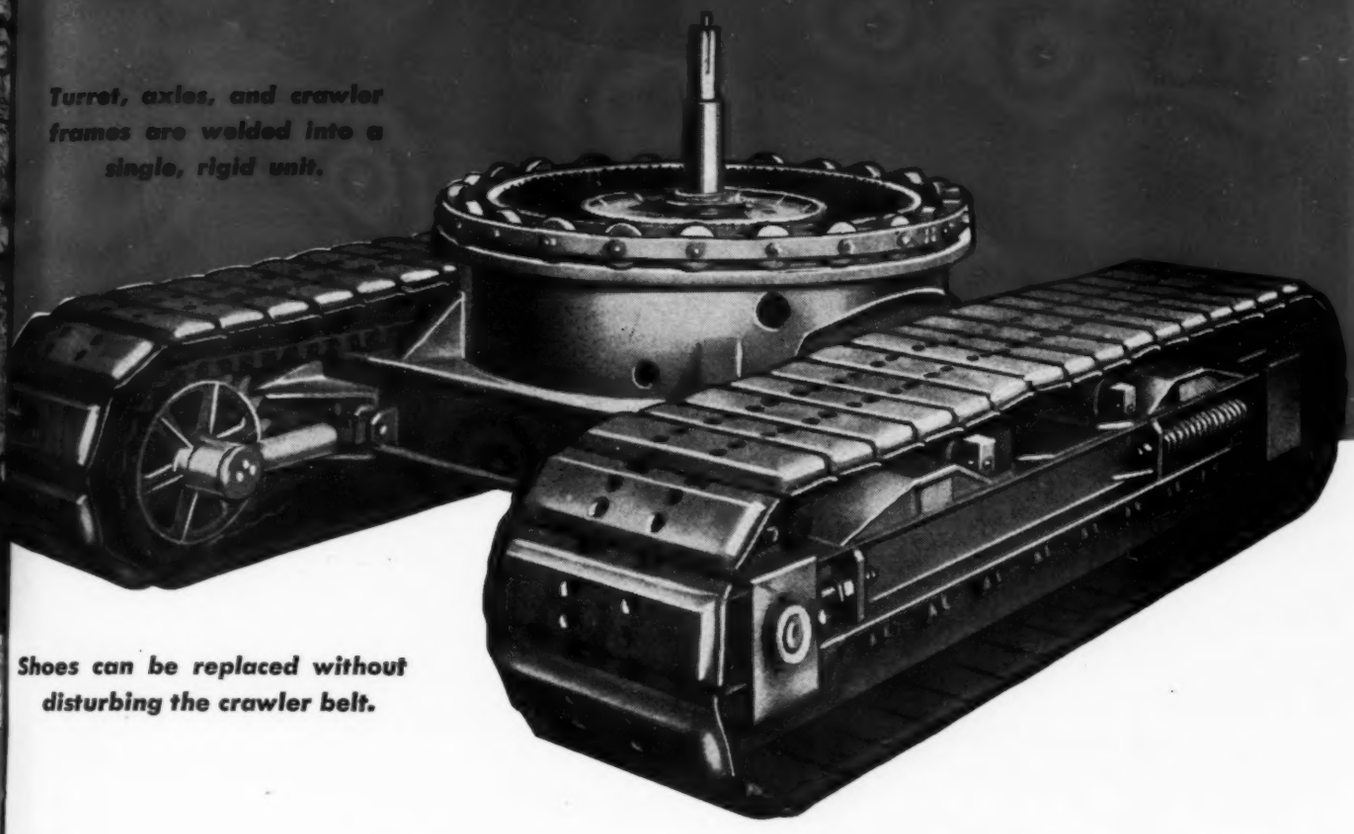
Here's the larger capacity you need to speed production, cut costs, on all kinds of jobs. It's fully convertible for service as shovel, dragline, crane, clamshell and pile driver. Ask for all the facts about its added values.



P&H Model 855-B dragline loaded complete on flat car — without dismantling.

for ADDED VALUES

THE *Only* 2-YD. EXCAVATOR WITH TRUE TRACTOR TYPE CRAWLERS



Turret, axles, and crawler frames are welded into a single, rigid unit.

Shoes can be replaced without disturbing the crawler belt.

ere's travel-ability never known before in a machine this size. These true tractor type crawlers, the kind at have proved themselves in millions of miles of rvice, put an end to the usual traction troubles; duce layup time. They're ready to travel under all ound conditions — in sand, gravel, deep mud — or er hard surfaces. Compensator springs keep crawler lts at proper tension, *always*. Maintenance costs are wer than for any other type of crawlers.

aneuvering is easier, too. With P&H's easy steering, u can make gradual turns, sharp turns, or right-out-face without stopping. Independent double acting hydraulic brakes positively lock the machine against movement while digging.

You'll find still more added values in these new P&H's, such as rapid reversing planetary chain crowd for greater accuracy, longer life; live roller circle for faster, easier swings; double hook rollers which eliminate teetering under heavy loads. And for crane service, independent planetary boom hoist and planetary lowering device which permits the accurate "inching" of loads. They'll save you money *now* in faster production. And they'll save you repair bills for years to come.

P&H **EXCAVATORS**

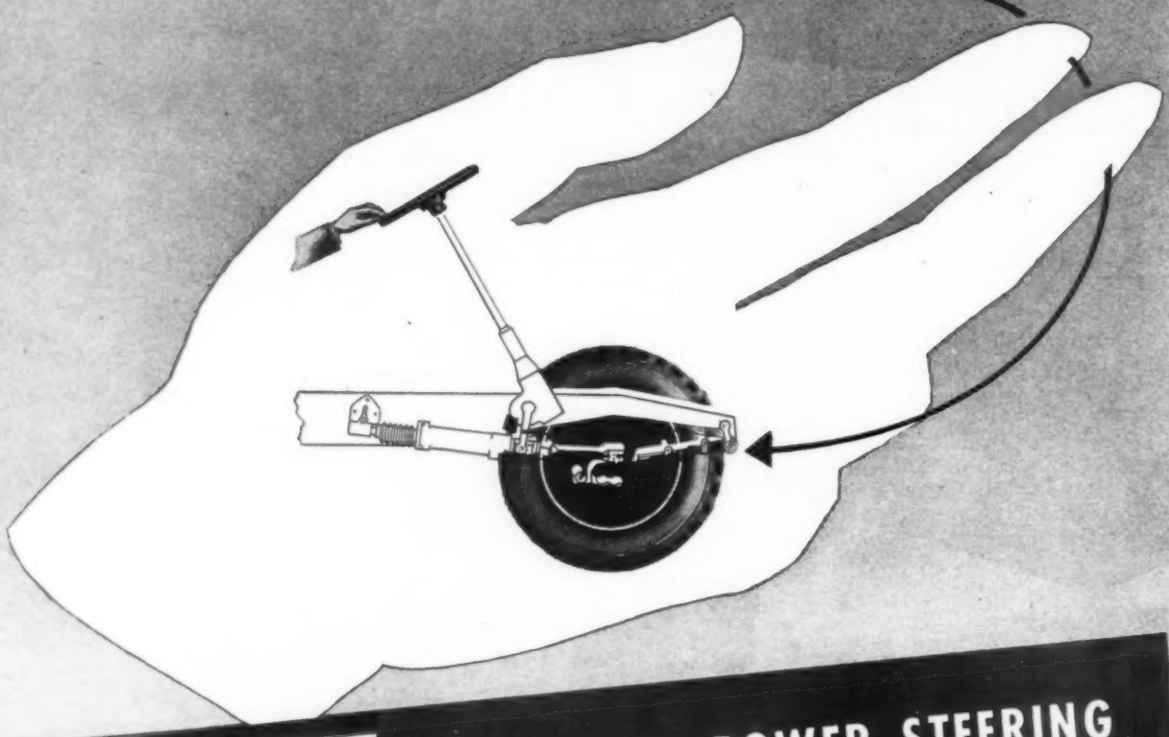
4496 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · HOISTS · WELDING ELECTRODES · MOTORS

P&H Excavators are built in sizes up to 6 cu. yds. capacity, gasoline, Diesel or electric power. Write for literature on the size you need.

INSTANTANEOUS FINGER-TIP RESPONSE



with VICKERS HYDRAULIC POWER STEERING

Two fingers on the steering wheel—it turns easily, and the front wheels of the heaviest truck or bus follow exactly. Vickers Hydraulic Power Steering does the work. And steering is just as easy over the roughest ground off the road as it is on smooth concrete. Road shock *cannot* be transmitted from the front wheels to the steering wheel or driver.

Steering is instantly responsive and firm—no rubbery feeling or wander. The driver is relieved of the most exhausting part of his job, enabling him to get more done with less fatigue.

Vickers Hydraulic Power Steering has many other advantages: (1) requires minimum space and is applied to most existing hand steering mechanisms with a few simple alterations; (2) automatic protection against abuse and excessive steering reaction forces; (3) automatic lubrication; (4) 15 years of successful operating experience. Ask for Bulletin 44-30.

VICKERS *Incorporated* • 1432 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices: CHICAGO • CINCINNATI • CLEVELAND • DETROIT • LOS ANGELES • NEWARK • PHILADELPHIA ROCHESTER • ROCKFORD • TULSA • WORCESTER

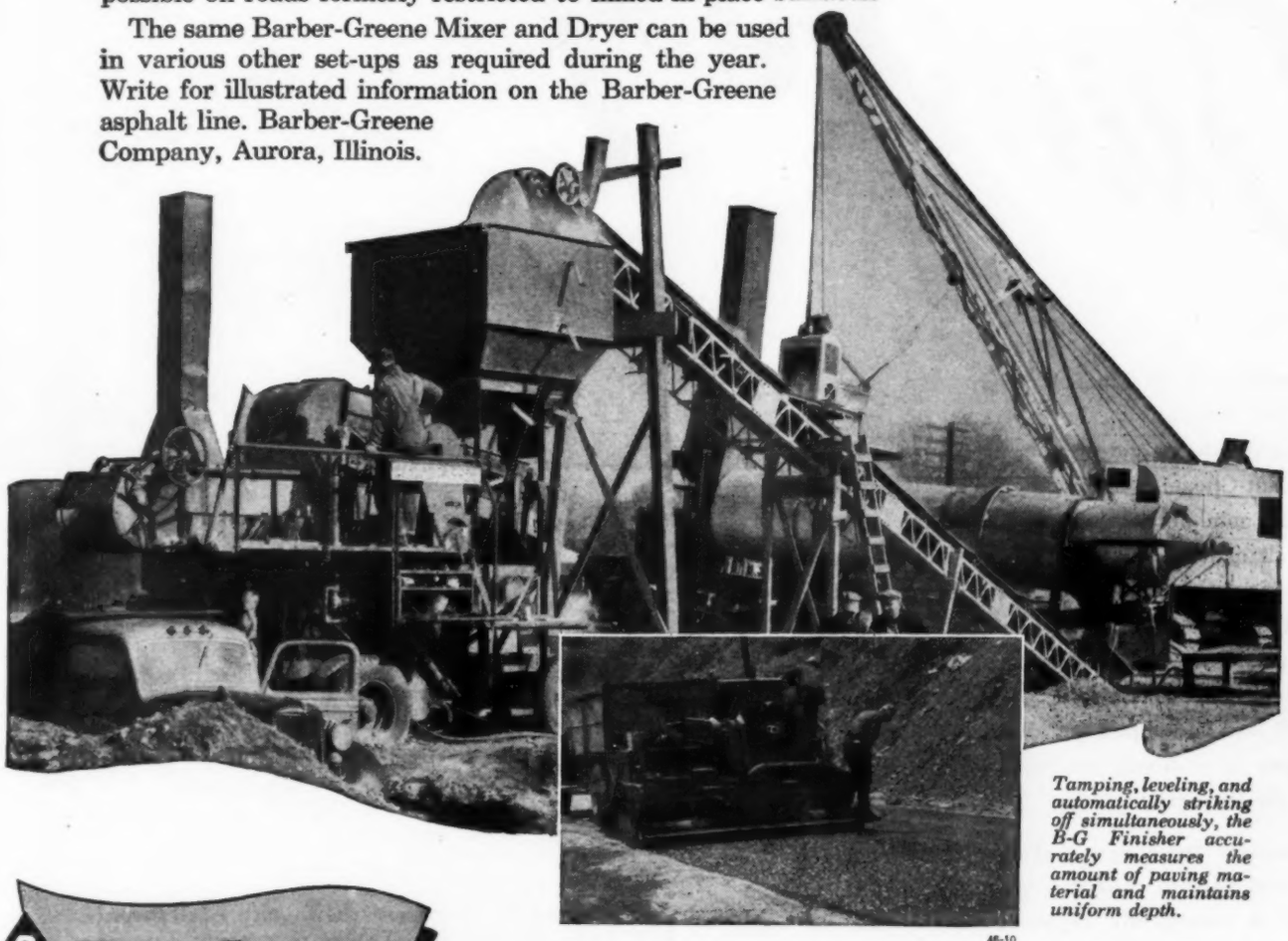
REPRESENTATIVE APPLICATIONS OF VICKERS HYDRAULIC POWER STEERING

How a B-G *Asphalt Plant* Provides "Intermediate" Mixing

• For "intermediate" roads—roads having traffic too heavy for a travel plant mat, but not sufficient to warrant the high type, densely graded Class I mixes—the Barber-Greene Mixer and Dryer may be combined to provide a plant quality mix at 10 to 120 tons per hour, depending on size of units.

Moisture content—responsible for the failure of many secondary pavements—is positively controlled by the B-G Intermediate Plant. In addition, use of heavier bitumens is permitted, producing a higher quality surface than can be obtained with road mix. And frequently at comparable cost. Temperature control gives this B-G plant a wide range of application, from road mix types to high quality asphaltic concretes. High capacity and low erection costs make high quality pavements possible on roads formerly restricted to mixed-in-place surfaces.

The same Barber-Greene Mixer and Dryer can be used in various other set-ups as required during the year. Write for illustrated information on the Barber-Greene asphalt line. Barber-Greene Company, Aurora, Illinois.



Tamping, leveling, and automatically striking off simultaneously, the B-G Finisher accurately measures the amount of paving material and maintains uniform depth.

48-10

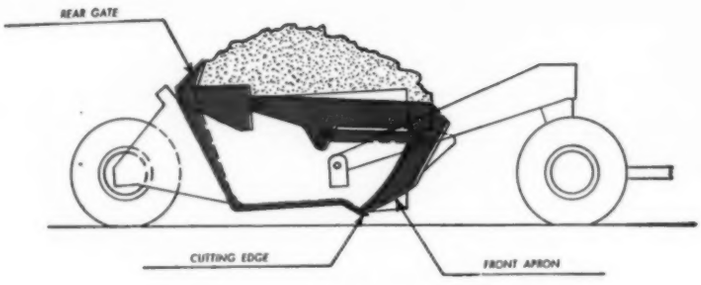
B-G Barber-Greene CONSTANT FLOW EQUIPMENT

LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES

FASTER . . .
. . . EASIER
CLEANER . . .
Dumping

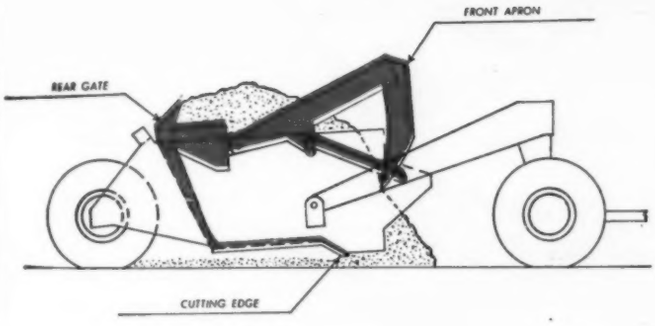
Regardless of the kind of material you have to load, you can always be sure that it will be dumped positively and cleanly on every trip with a LaPlant-Choate "Carrimor." This is because the rear gate of the "Carrimor" not only bulldozes all material out of the bowl but the front apron moves ahead and out of the way at the same time. So there's no chance of jamming or sticking . . . no lost time or broken cables trying to get rid of that "last yard." With a "Carrimor" the full load is dumped quickly and easily and the rear gate is positively returned the full distance, ready for the next trip.

Moreover, these new LaPlant-Choate scrapers in 8- and 14-yard capacities will carry a uniform spread at consistently higher tractor speeds because the cutting edge is positively controlled and completely independent of other moving elements. Add to these advantages superior "load-ability," "grade-ability" and low horsepower requirements and you'll see why so many agree on LPC for lowest possible cost per yard. See your LaPlant-Choate distributor, or write: LaPlant-Choate Manufacturing Company, Inc., Cedar Rapids, Iowa; 1022 77th Avenue, Oakland, California.

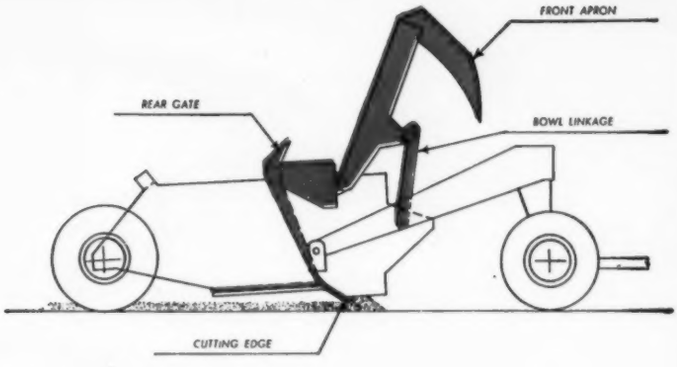


Here is an LPC "Carrimor" shown with a full heaped load, ready for dumping. Thanks to a newly designed cable arrangement, the cutting edge can now be lowered to any desired spreading depth and positively locked to insure a smooth, even spread, without further manipulation of the power control unit.

LaPLANT
Engineered



This sketch shows you the generous initial opening of the front apron, which allows the material in the front of the bowl to spill out by gravity before the rear gate starts forward. Note how the front apron moves ahead as it travels up, thus assuring an absolutely free exit of material.



Here you see an LPC "Carrimor" in full dumping position, showing how LaPlant-Choate's patented linkage arrangement functions in emptying the scraper bowl completely, without any chance of jamming sticky or bulky material between the rear gate and front apron—an exclusive LaPlant-Choate feature!

-CHOATE

Earthmoving

Lowest Possible Cost per yard

Heltzel Steel Form & Iron Co., Warren, Ohio.
Send me catalog(s) indicated.

- ☐ B-19—Steel Highway and Airport Forms.
- ☐ A-20—Steel Forms for Curbs or Curb and Gutters or Sidewalks.
- ☐ Put me on your mailing list for new bulletins as they are issued.

Name _____

Address _____

_____

_____

(Type of construction usually engaged in)

Steel Forms for Straight or Battered Curbs. Rigid and Flexible Radius Forms to match.

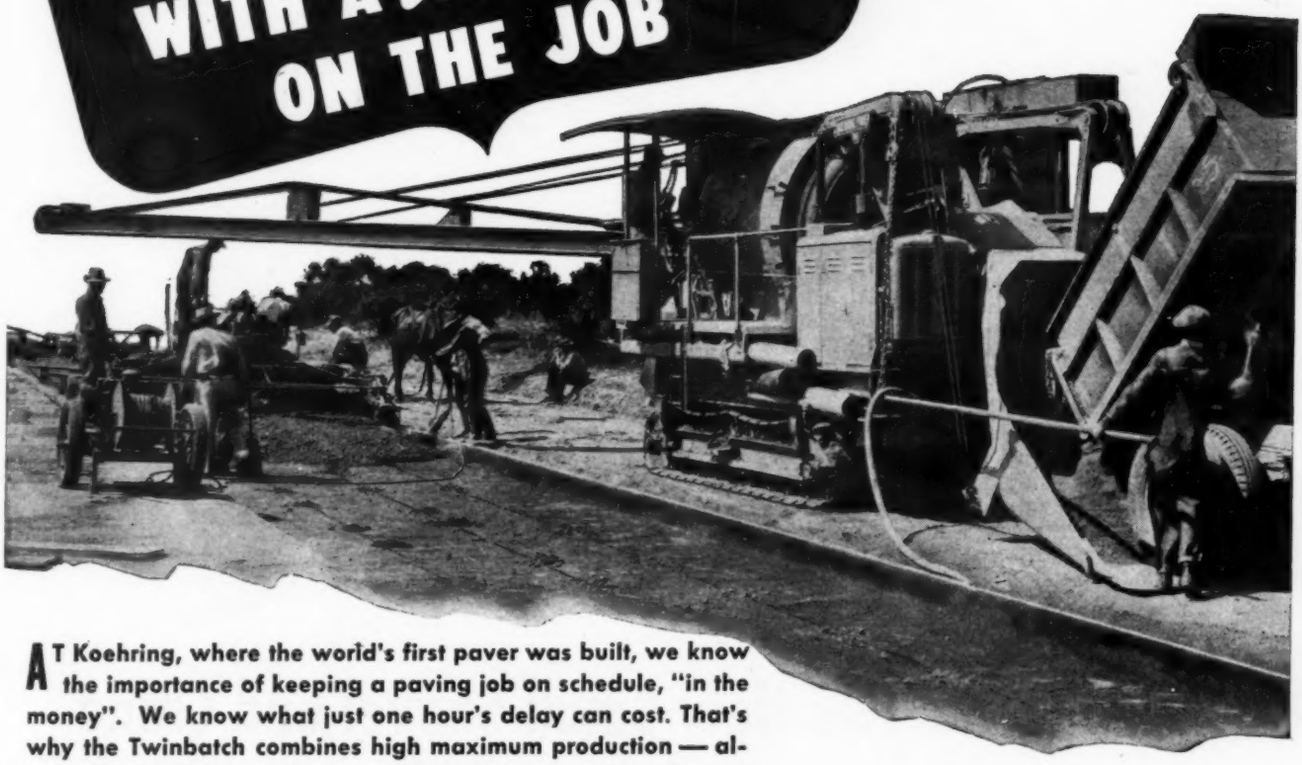
Steel Sidewalk Form

Rigid Radius Curb and Gutter Form.

Curb and Gutter Form with Single Bottom Radius Face Curb.

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO · U. S. A.

NEW ROUTES COME THRU ON SCHEDULE WITH A *twinbatch* ON THE JOB



AT Koehring, where the world's first paver was built, we know the importance of keeping a paving job on schedule, "in the money". We know what just one hour's delay can cost. That's why the Twinbatch combines high maximum production — almost 90 batches per hour, enough concrete to lay down a 1,000 foot slab, 20 feet wide, in four hours — with exceptional Heavy-Duty strength.

HEAVY-DUTY PAVER

Because it's built right for on schedule service, the Twinbatch is a Heavy-Duty machine. Every detail tells a Heavy-Duty story: 16-inch 78-lb. steel I beams make up the main frame. The heavy two-compartment drum has extra alloy liners. Drum roller paths are the heaviest and thickest of any paver.

CONTINUOUS EFFICIENT SERVICE

Because maximum efficiency is safe-guarded by Heavy-Duty construction, high production continues uninterrupted. Unfailing, the Twinbatch sets an efficient, money-making pace for the crew. At the customary 60-batches-an-hour clip, the Twinbatch works smoothly, effortlessly . . . easy on the operator, easy on the crew. When rains cause delays, its top output of 86.7 batches per hour gets the job back on schedule — fast.

KOEHRING

34-E

twinbatch

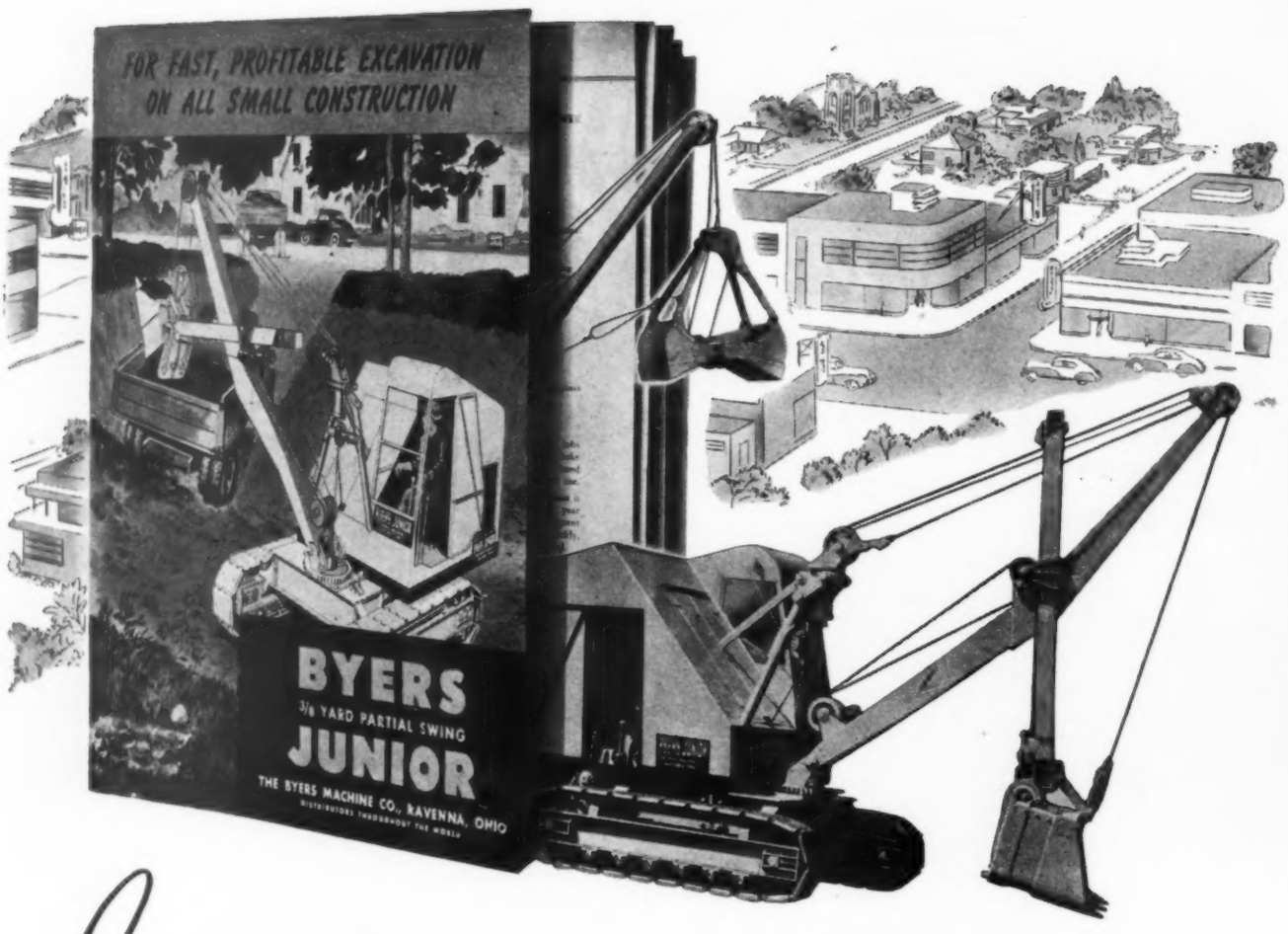
PAVER

TWO COMPARTMENT DRUM

KOEHRING COMPANY • *Milwaukee 10, Wisconsin*

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT



Investigate this New Small Shovel and Crane

The pages of this complete catalog will show you the ways in which Byers JUNIOR, the flexible ⅜-yd. shovel and crane, will make money for you.

Small contractors, construction or excavating companies, returned service men now starting in the construction industry . . . will profit by weighing the many outstanding advantages of the new Byers Junior. County engineers, township road superintendents, state highway engineers, will find in this versatile excavator the answer to many earth moving and material handling problems.

Here's a full ⅜-yd. capacity shovel, crane, clamshell, dragline and back hoe, fast, powerful, highly mobile, capable of doing a big day's work. Built by the most successful manufacturer of small excavators of the partial swing type, Byers JUNIOR has a long and experienced background of successful operation.

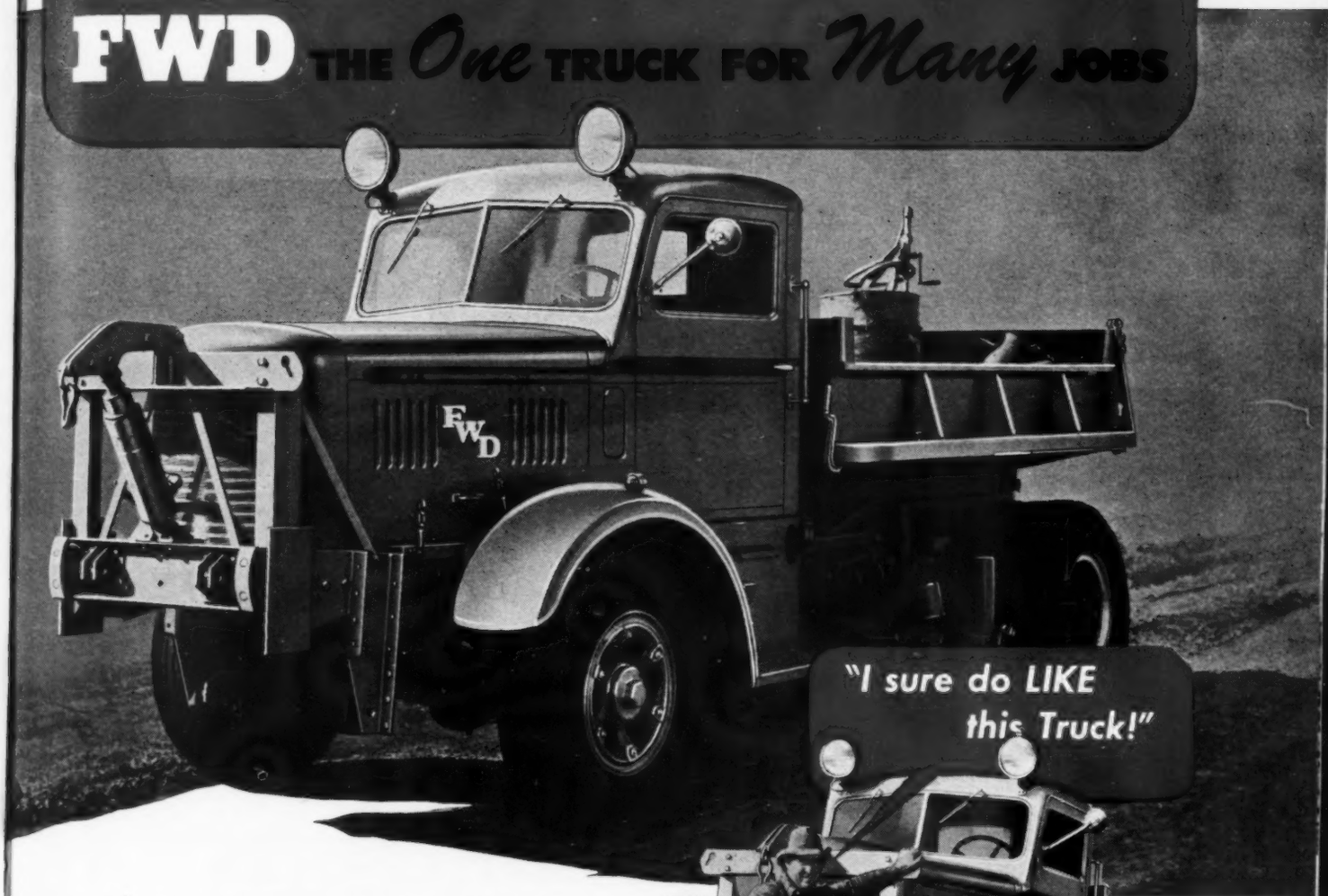
Don't miss this catalog. Write for it today. No obligation.

THE BYERS MACHINE CO., Ravenna, Ohio

Distributors throughout the World

BYERS 3/8 Yd. JUNIOR

FWD THE *One* TRUCK FOR *Many* JOBS



There was genuine pride in the voice of driver Bob McBride as he told the FWD photographer "I sure do like that truck!" It's the newest and biggest of the Logan County, Colorado, Highway Department's fleet. For 15 years Logan County has used every one of its FWDs to do many jobs, from grading and weed removal to heavy snow clearing.

SPRING • SUMMER • FALL and WINTER

Wherever highway construction and maintenance men operate, the outstanding ability of FWD trucks with under-body blade equipment is well known and valued. On their blading ability alone, FWDs rate as first choice for highway duty . . . but the same truck that does this work so well does scores of other highway jobs equally well, throughout all seasons of the year.

Back of FWD superior performance is the experienced, specialized FWD engineering that provides the highest development of the true four-wheel-drive principle with center differential . . . engineering that equalizes power and load distribution, puts driving power and traction on all wheels, divides working-strains over two driving axles . . . engineering that gives FWDs the power, ruggedness, dependability and economy that makes these all-purpose trucks the first choice of highway authorities.

See your FWD dealer, or write for information on FWD trucks now ready to go to work for you.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis., U.S.A.

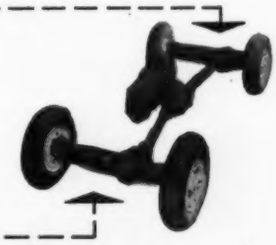
Canadian Factory: KITCHENER, ONTARIO

FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

FOUR-WHEEL-DRIVE

A "plus" that pays in many ways

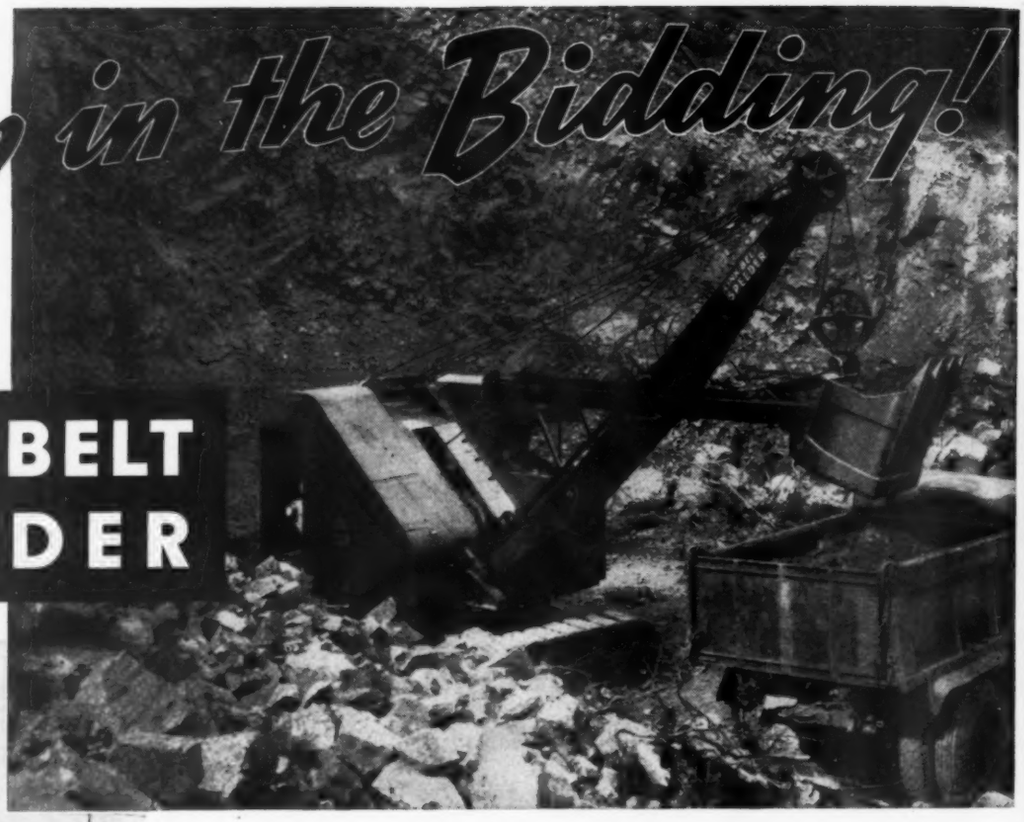


"MORE POWER ON MORE WHEELS"

Keep in the Bidding!

WITH YOUR

LINK-BELT SPEEDER



QUICK, EASY CONVERTIBILITY KEEPS THIS MACHINE BUSY *More of the Time!*

The standard Link-Belt Speeder "Shovel-crane", readily converted from one front-end attachment to another, will do most of the earth-moving or material-handling operations required on the average job. The contractor with a Link-Belt Speeder can thus bid on many kinds of jobs, and as a result, keeps busy more of the time. The Link-Belt Speeder "Shovel-crane" does more work — more kinds of work, *more of the time!*

For Prompt, Efficient, Convenient Sales and Service:
There is a Link-Belt Speeder Distributor Located Near You

LET'S MAKE AMERICA THE LAND OF **GOOD ROADS!**

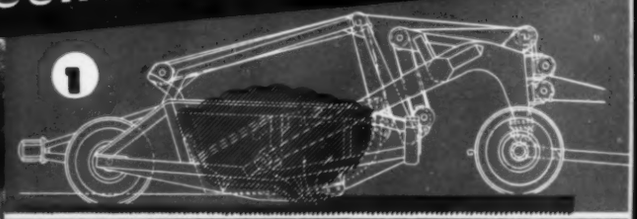
LINK-BELT SPEEDER

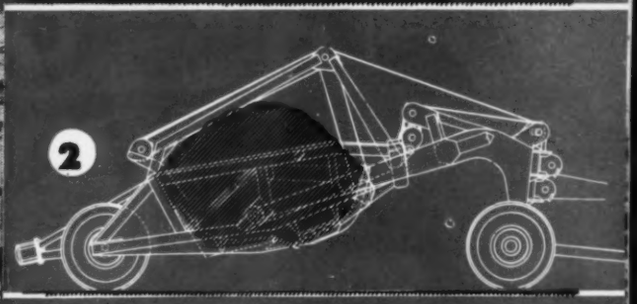
Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

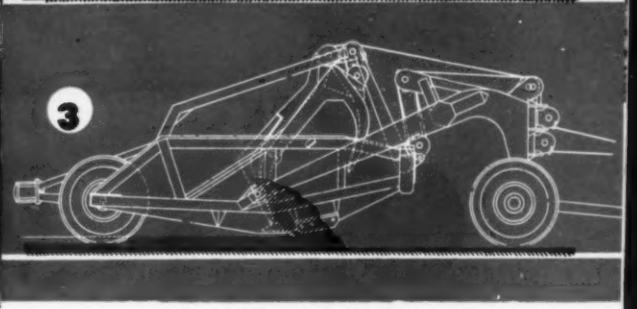
LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
A DIVISION OF LINK-BELT COMPANY

Down-to-Earth Engineering

GAR WOOD Earth Moving Equipment Features Practical Design and Sound Construction







GAR WOOD 4-Wheel Cable Scrapers are *all scraper,* well engineered, honestly built of high quality materials, developed and proved over a period of many years—scrapers that *hold together* and get big yardage jobs done at consistently good speed with an absolute minimum of down time. Some of the many outstanding engineering features, as well as the rugged simplicity of the mechanism, are shown in the three drawings above:

1. LOADING: The self-loading is by positive digging to depths down to 12". "Boiling" action of dirt loads bowl and patented apron evenly by reason of proper angle of the cutting edge. Positive digging action is assured in all types of materials by proper location of draft point.

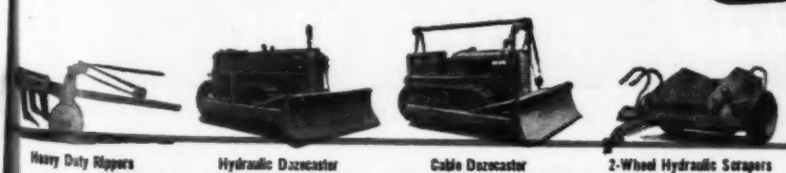
2. CARRYING: This position provides extremely high clearance of cutting edge, essential in traveling over uneven ground and in discharging sticky materials. Proper weight distribution with exceptionally low center of gravity assures stability—provides for maximum tire life.

3. DUMPING AND SPREADING: The first portion of the load dumps automatically when the apron is raised. The remainder is forced out by *positive rolling ejection.* Note extremely large apron opening to facilitate this ejection of all types of materials. Cutting edge remains stationary throughout cycle, providing for even, *accurate control* of the spread by the heavy duty *Gar Wood Cable Control Unit.*

Contact your Allis-Chalmers dealer. He will be glad to show you Gar Wood earth moving equipment and arrange for you to see on-the-job performance in your locality.

GAR WOOD ROAD MACHINERY

WITH ALLIS-CHALMERS DIESEL POWER



Heavy Duty Rippers | Hydraulic Dozocaster | Cable Dozocaster | 2-Wheel Hydraulic Scrapers

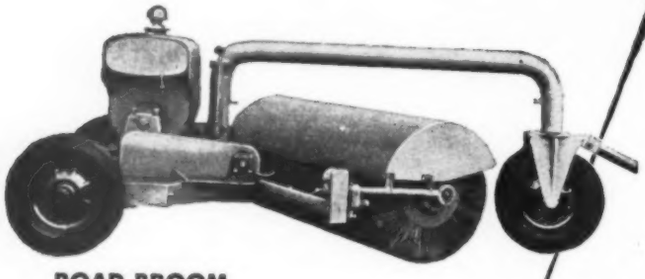
Sold Through
ALLIS-CHALMERS
Dealers Everywhere

ROAD MACHINERY DIVISION
GAR WOOD INDUSTRIES, INC.
DETROIT 11, MICHIGAN

OTHER GAR WOOD PRODUCTS: HOISTS AND BODIES • TANKS • WINCHES AND CRANES • HEATING EQUIPMENT • MOTOR BOATS

IT'S NOT WHAT YOU LIKE TO DO - BUT WHAT YOU DO THAT COUNTS

"SPRAY MASTER"
PRESSURE DISTRIBUTOR



ROAD BROOM

"TANKAR"
STEAM HEATER

SUPPLY TANK

When those big Black Top Road, Highway or Airport Runway jobs are ready for Construction or Repair—do you *like to do* a modern, efficient job—or do you *do* a modern efficient job?

If you have the right Equipment, engineered, tested and proven like Littleford "Spray Master" Pressure Distributors, Road Brooms, "Tankar" Steam Heaters, Supply Tanks, then there's no reason for not doing a perfect Black Top Job.

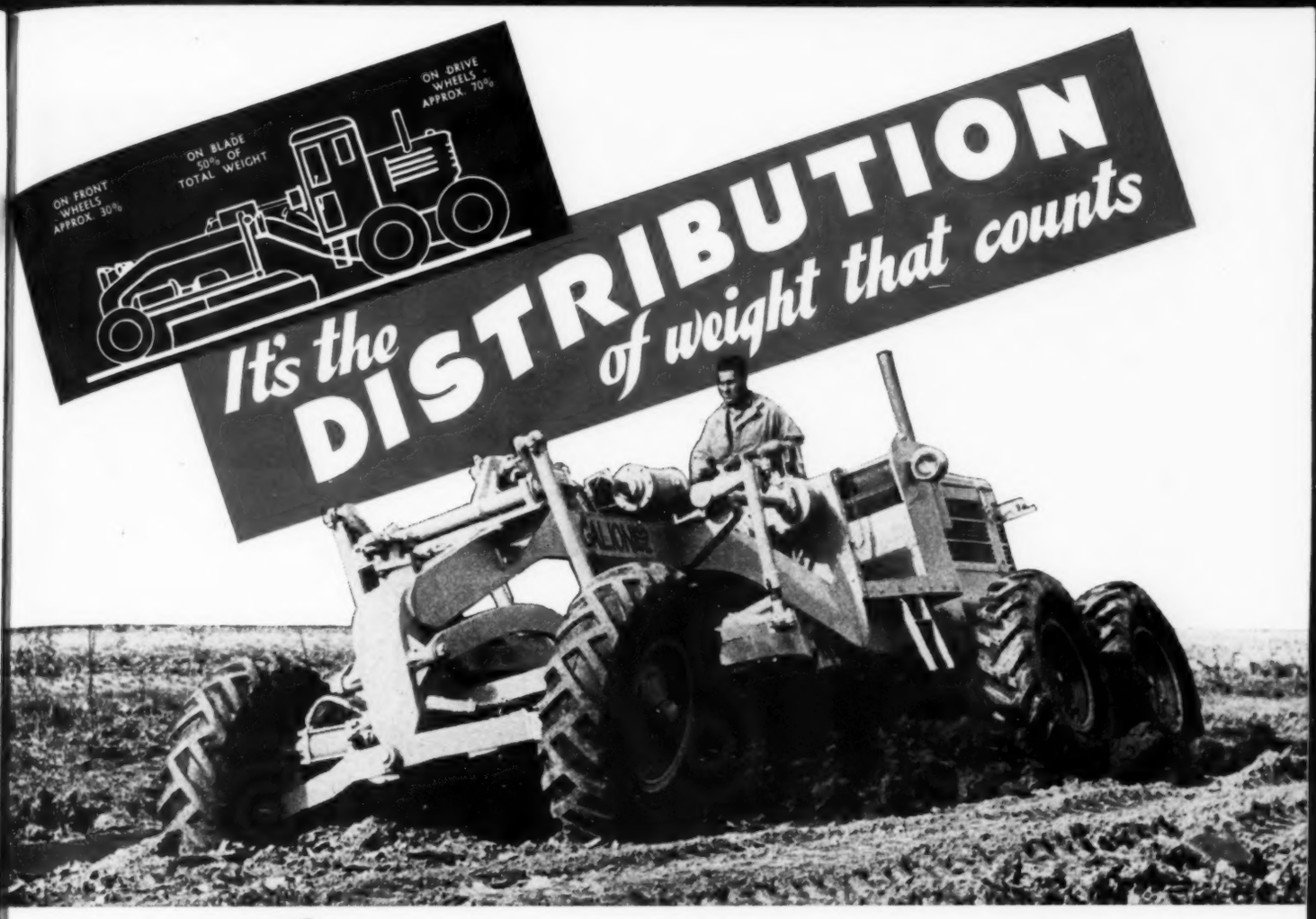
Let's take a look at these Littleford Units and see why they're efficient and modern. The "Spray Master" with Full Circulating Vacuum Flow Spray Bar circulates the material by Vacuum, not pressure. Road Brooms have Hydraulic Tension Control on the Brush for adjusting Brush tension on Road Surface. "Tankar" Steam Heater produces steam in two minutes' time. Supply Tanks can be built without the use of a frame—known as Littleford Frameless Constructed tanks. It's what you *do* that counts and you can count on Littleford Black Top Road Equipment.

LB — BLACK TOP ROAD MAINTENANCE EQUIPMENT — SINCE · 1900

LITTLEFORD

LITTLEFORD BROS., Inc.

454 E. PEARL ST., CINCINNATI 2, OHIO


ON FRONT WHEELS APPROX. 30%
ON BLADE 50% OF TOTAL WEIGHT
ON DRIVE WHEELS APPROX. 70%
It's the DISTRIBUTION of weight that counts

ONLY GALION IRON WORKS GRADERS GIVE YOU ALL THESE FEATURES

1. Full hydraulic control.
2. Extra rugged single member frame.
3. Scientific weight distribution.
4. Full revolving, full reversible blade--effortless control and adjustment.
5. Choice of Diesel or gasoline power units--nationally known for economy and dependability.
6. Sturdy and compact enclosed gear transfer drive between engine and transmission.
7. Heavy duty transmission with eight forward and two reverse speeds.
8. Totally enclosed gear-driven tandem drive--mounted on axle housing or carrier.
9. Ball and socket drawbar connection to head block.
10. Rigid drawbar and circle assembly.
11. No side sway or springing of moldboard under full load.
12. Wide clearance between front wheel and blade.

Plus many other time-and money-saving features.

Weight alone is not sufficient in a motor grader. It must be properly distributed if the highest working efficiency is to be obtained.

The GALION design places approximately 70% of the weight on the drive wheels so as to use all engine power for tractive effort. Front wheels take approximately 30% of the weight. This efficient distribution of weight permits utilization of maximum pressure (approximately 50% of total weight) on the blade without stalling.

You will find correctness of basic design strictly adhered to throughout every feature of GALION Motor Graders. It's one of the prime reasons for the outstanding performance record a GALION Grader makes on any job--whether it's bank cutting, road widening, scarifying, ground leveling, or street construction.

THE GALION IRON WORKS & MFG. CO.
GALION, OHIO

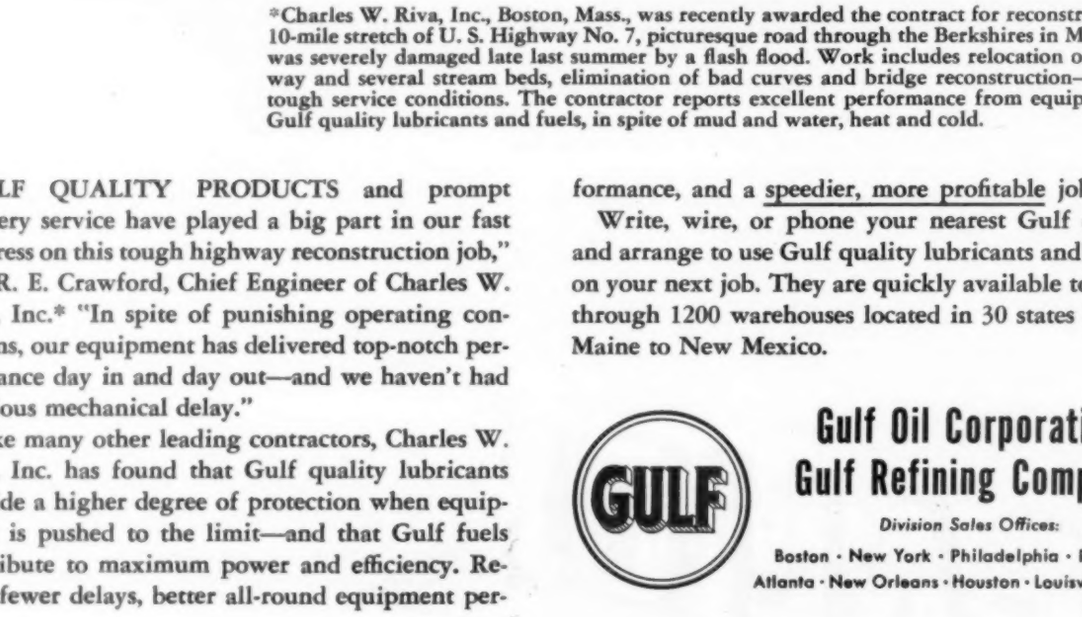
Catalog No. 290 gives complete information on the NEW Galion Model 102 Motor Grader--write for your copy today, and names of nearest Distributors.

GALION IRON WORKS

GRADERS · ROLLERS

"Gulf Products and Fine Service are a big help on a tough job"

says this highway contractor



*Charles W. Riva, Inc., Boston, Mass., was recently awarded the contract for reconstruction of a 10-mile stretch of U. S. Highway No. 7, picturesque road through the Berkshires in Mass., which was severely damaged late last summer by a flash flood. Work includes relocation of the highway and several stream beds, elimination of bad curves and bridge reconstruction—all under tough service conditions. The contractor reports excellent performance from equipment with Gulf quality lubricants and fuels, in spite of mud and water, heat and cold.

"GULF QUALITY PRODUCTS and prompt delivery service have played a big part in our fast progress on this tough highway reconstruction job," says R. E. Crawford, Chief Engineer of Charles W. Riva, Inc.* "In spite of punishing operating conditions, our equipment has delivered top-notch performance day in and day out—and we haven't had a serious mechanical delay."

Like many other leading contractors, Charles W. Riva, Inc. has found that Gulf quality lubricants provide a higher degree of protection when equipment is pushed to the limit—and that Gulf fuels contribute to maximum power and efficiency. Result: fewer delays, better all-round equipment performance, and a speedier, more profitable job!

Write, wire, or phone your nearest Gulf office and arrange to use Gulf quality lubricants and fuels on your next job. They are quickly available to you through 1200 warehouses located in 30 states from Maine to New Mexico.

GULF

Gulf Oil Corporation
Gulf Refining Company

Division Sales Offices:
Boston · New York · Philadelphia · Pittsburgh
Atlanta · New Orleans · Houston · Louisville · Toledo

A Great New TRAXCAVATOR

Greater Capacity
Bigger Output
Lower Yardage Costs
Easier Handling
Complete Visibility
Maximum Stability
Year-Around Utility

It's the Model IT4

A great new TRAXCAVATOR is here, with all the basic advantages that have made TRAXCAVATORS the standard of comparison the world over, plus many features that insure easier handling, bigger output and lower yardage costs. Thoroughly field tested under severest conditions, the IT4 is the most rugged and productive tractor shovel of its size ever offered. It will excavate and dig big yardages at low cost in toughest soils, load trucks and trailers, transport and load all kinds of bulk materials and also ditch, cast, carry, spread, strip, bulldoze, backfill, level, landscape, terrace, trench, remove snow and do a host of other earth-moving and material-handling jobs. This versatility means year around usefulness and profit. The big one-cubic yard bucket is wider than the tractor tracks which permits excavating and grading close to and alongside walls and curbs and easy maintenance of grades. The IT4 and "Caterpillar" D4 tractor on which it mounts are engineered as a unit to match the full capacity of each other and are sold and serviced by the same dealers. Get the facts on this modern, new TRAXCAVATOR from your TRACKSON-"Caterpillar" dealer or write direct.

TRACKSON COMPANY, Dept. RS-56, Milwaukee 1, Wis.

TRAXCAVATOR

REG. U. S. PAT. OFF.

THE ORIGINAL TRACTOR EXCAVATOR

Will the highway gremlins go ON STRIKE?

No, the highway gremlins won't go on strike. They'll keep right on digging pot holes in roads, cracking pavements, splashing buckets of rain and sleet on slippery highways. Unless you do something to stop them they'll take their toll . . . death, destruction, delays to transportation, increased upkeep for motorists.

What plans are you making to improve the roads serving your community, your State? Are you building safety into your highways? Are you planning wisely?

Koppers skid-resistant Tarmac should play an important part in your highway program. Send for the booklet "Surfacing with Tarmac" which illustrates why many types of highway work can be done better with Koppers Tarmac than any other material.—Koppers Company, Inc., Tar and Chemical Division, Pittsburgh 19, Pennsylvania.

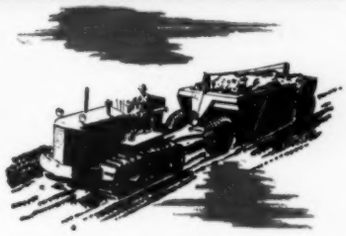
KOPPERS COMPANY, INC.

KOPPERS

The Industry that Serves All Industry

Grinding steering drums to a high finish in the Oliver "Cletrac" plant.

You can't Beat this drum!



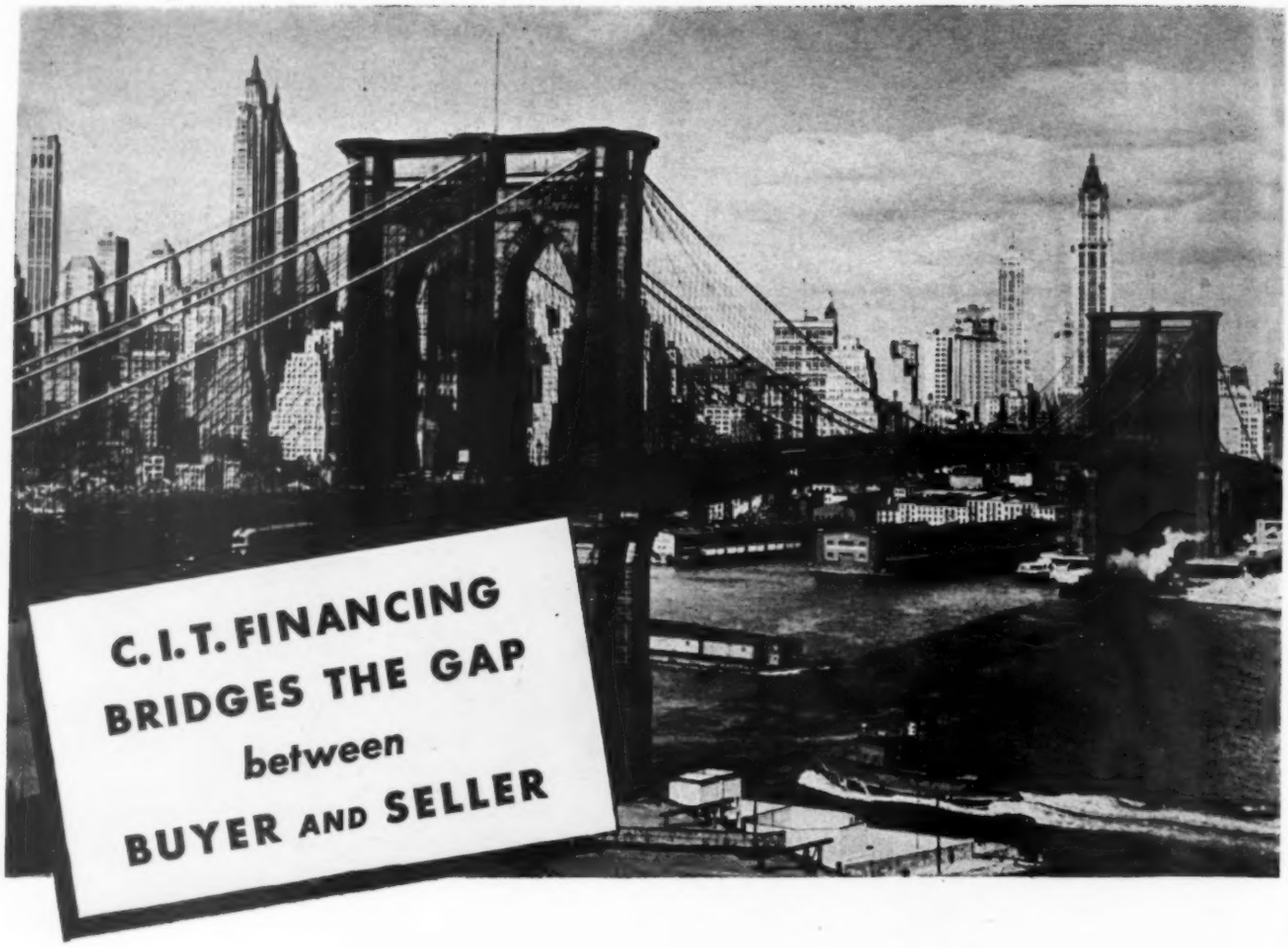
For sheer quality, you'll find it hard to beat the steering drums on an Oliver "Cletrac" crawler tractor. Made of the highest quality materials, drums are ground and polished to a high finish, providing maximum contact and longer life for the steering bands. They're another example of the *extra* quality built into Oliver "Cletracs."

The manufacturing knowledge of Oliver "Cletrac" engineers, the modern production methods, and up-to-date equipment plus experienced, capable craftsmen, permit the addition of these high quality design features without the penalty of added cost to the user. *Extra* quality is standard on Oliver "Cletracs."

Maintenance of this standard enables your Oliver "Cletrac" dealer to offer you the finest in crawler tractors . . . for your every need.

CLETRAC — THE OLIVER CORPORATION — Cletrac

a product of **The OLIVER Corporation**



CONTRACTORS: When you use C.I.T. funds to buy construction equipment, a financial bridge is erected that makes it easier for you to acquire an adequate assortment of machinery.

There's no need to tie up working capital when you purchase additional equipment. Conserve your funds for payrolls, supplies, general operating uses. LET C.I.T. FURNISH THE MONEY to buy income producing machinery.

C.I.T. WILL FINANCE THE PURCHASE of construction equipment AT LOW COST. Any amount, any time, for immediate use or future deliveries.

More than one piece of equipment can be financed . . . combine several purchases of new, used or surplus machinery in one obligation. Retire the investment over extended periods through monthly amortization payments.

Any of these offices are at your service. Write, wire or call.

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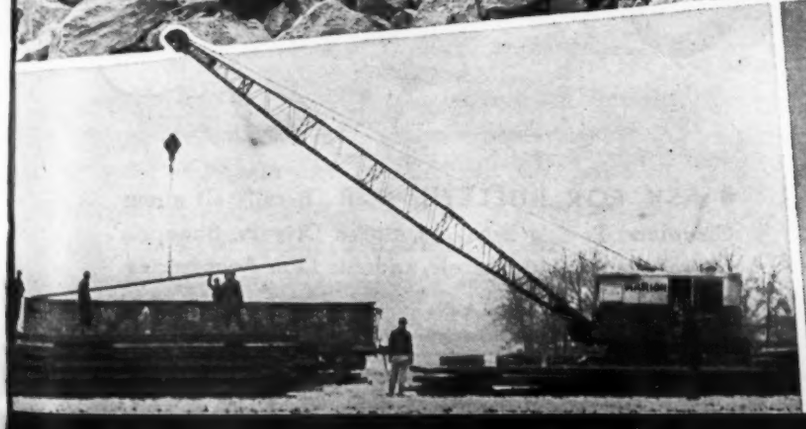
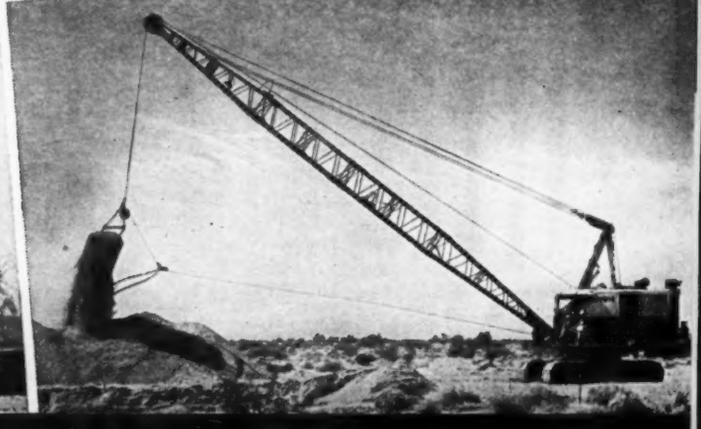
Tough Jobs Are Easy For MARIONS

Watch a MARION at work. See how it takes the toughest kind of digging in its stride. It has been doing this for 63 years—giving every buyer of MARION shovels plus value—in big yardage—low cost operation—reliable service—dependable performance. Today—more than ever before—MARION machines are "geared" to the tremendous construction job ahead. Speed up your contracts with MARIONS.

What is your material handling problem?





MARION

POWER SHOVEL COMPANY

MARION, OHIO, U. S. A.

Offices and Warehouses in all Principal Cities from ¾ cu. yd. to 40 cu. yds.

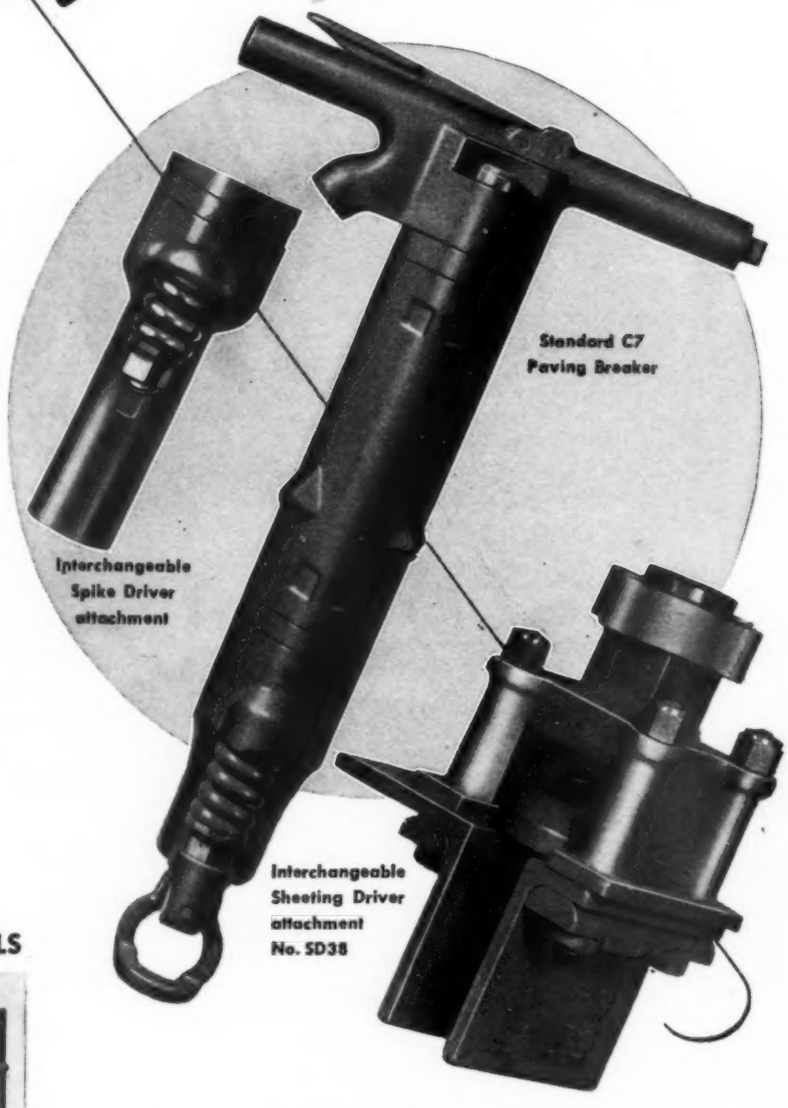
Note: Marion Power Shovel Company—Formerly The Marion Steam Shovel Company—Established 1884

Use 1 CLEVELAND tool for 3 jobs!

★ PAVING BREAKING

★ SHEETING DRIVING

★ SPIKE DRIVING



Of course, you will find husky, air-saving Cleveland Paving Breakers ideal for tearing up paving, demolition work, frost breaking, ripping up foundations, breaking shale, hard ground, etc. In addition, they are readily adaptable for other jobs. You can quickly change to the Sheeting Driver Attachment. It handles 2" or 3" sheeting and never splits or "brooms" the boards. Another easy change of the front head, and your tool becomes a powerful Spike Driver.

Thus by purchasing one Cleveland tool plus two attachments, you get triple duty at a big savings in initial cost.

These attachments can be used with three Cleveland Paving Breakers: the 80-lb. C7, the 82-lb. C9, and the 58-lb. C11. You can run two of any of these models from a No. 105 compressor.

CLEVELAND CHISELS, MOILS, TOOLS

Moil | Narrow Chisel | Wide Chisel | Digging Blade | Sheeting Driver | 7" Tamper Bar | 5" Tamper Bar | Clay Blade | Clay Spade | Asphalt Cutter

• **ASK FOR BULLETIN 128.** It tells all about Cleveland Paving Breakers, Spike Drivers, Sheeting Drivers, Moils and Chisels, and Air Line Accessories.

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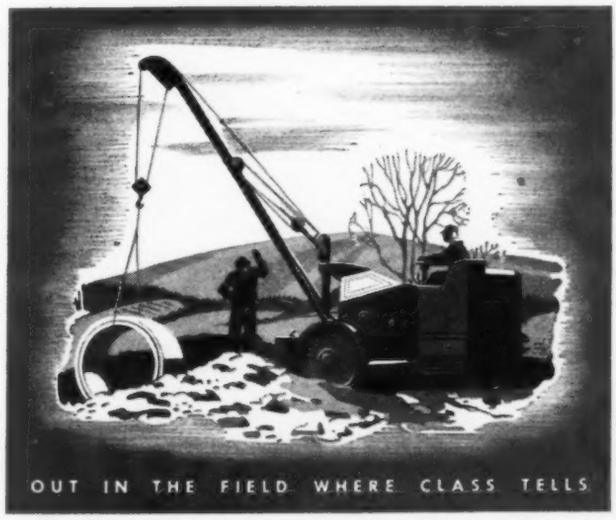
THE CLEVELAND PNEUMATIC TOOL COMPANY
CABLE ADDRESS: "ROCKDRILL" • CLEVELAND 5, OHIO

Leaders- in DRILLING EQUIPMENT

Chrysler Industrial Engines Offer A New Excellence In Quality

HISTORY* . . . For a full generation Chrysler-powered vehicles, vessels and equipment have established new standards of performance—a new excellence of quality resulting from time-tested principles of power application.

Chrysler Industrial Engines, in many types of equipment, have registered, out in the field where class tells—new economy, efficiency and longer life over extensive periods of continuous operation.



OUT IN THE FIELD WHERE CLASS TELLS

Definite proof of the outstanding performance of Chrysler Industrial Engines is their approval and acceptance by over 150 end product manufacturers to power 35 different types of equipment.

These versatile engines are designed, engineered and built completely in the great Chrysler plant. This brings a new excellence of quality—"Horsepower With a Pedigree" to users of industrial power.

*One of the 8 *character points* in the Chrysler Industrial Engine Pedigree

Time-Tested Principles of Application

Year in and year out Chrysler Industrial Engines continue to deliver efficient and economical power to owners in many different types of applications.

Chrysler first developed high compression flexible horsepower—adapted it to industrial power use. Then Chrysler engineers cooperated closely with powered equipment manufacturers — coordinating engine and end product for greater efficiency and economy.

These basic principles of industrial power application have stood the test of thousands of hours of operation in the most rugged types of service.

As a result, Chrysler Industrial Engines are providing dependable low cost power for tractors, cranes, shovels, draglines, pumps, air compressors, generator sets and other applications in construction.

Attention Dealers: Some desirable Chrysler Industrial Engine territories are available. Write to the Chrysler Industrial Engine Division for complete information.

"LISTEN TO THE MUSIC OF ANDRE KOSTELANETZ, THURSDAYS, CBS 9 P.M., E.S.T."

CHRYSLER
INDUSTRIAL ENGINES
Horsepower with a Pedigree

Industrial Engine Division, Chrysler Corp.
12208 East Jefferson, Detroit 31, Michigan

Please send the Chrysler Industrial Engine Catalog.

Name_____

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Longer Life...Lower Maintenance

CP PORTABLE COMPRESSORS

ENGINE speed keeps exact pace with air demands in CP Portable Compressors because of the *Gradual Speed Regulator.* Operating at maximum speed to meet partial load requirements is completely avoided. This means elimination of unnecessary wear and a fuel economy that gives 15% to 35% more air per gallon of fuel. Maximum portability, due to light and compact construction, is another outstanding advantage of these Chicago Pneumatic Portable Compressors. Write for a copy of Bulletin 758-2.

Chicago Pneumatic Portable Compressors are available in gasoline powered models of 60, 105, 160, 210 and 315 C.F.M.; and in Diesel powered sizes of 105, 160, 210, 315 and 500 C.F.M.; with steel wheels, pneumatic-tired wheels or skid mountings.

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PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

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TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

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AIR COMPRESSORS
VACUUM PUMPS
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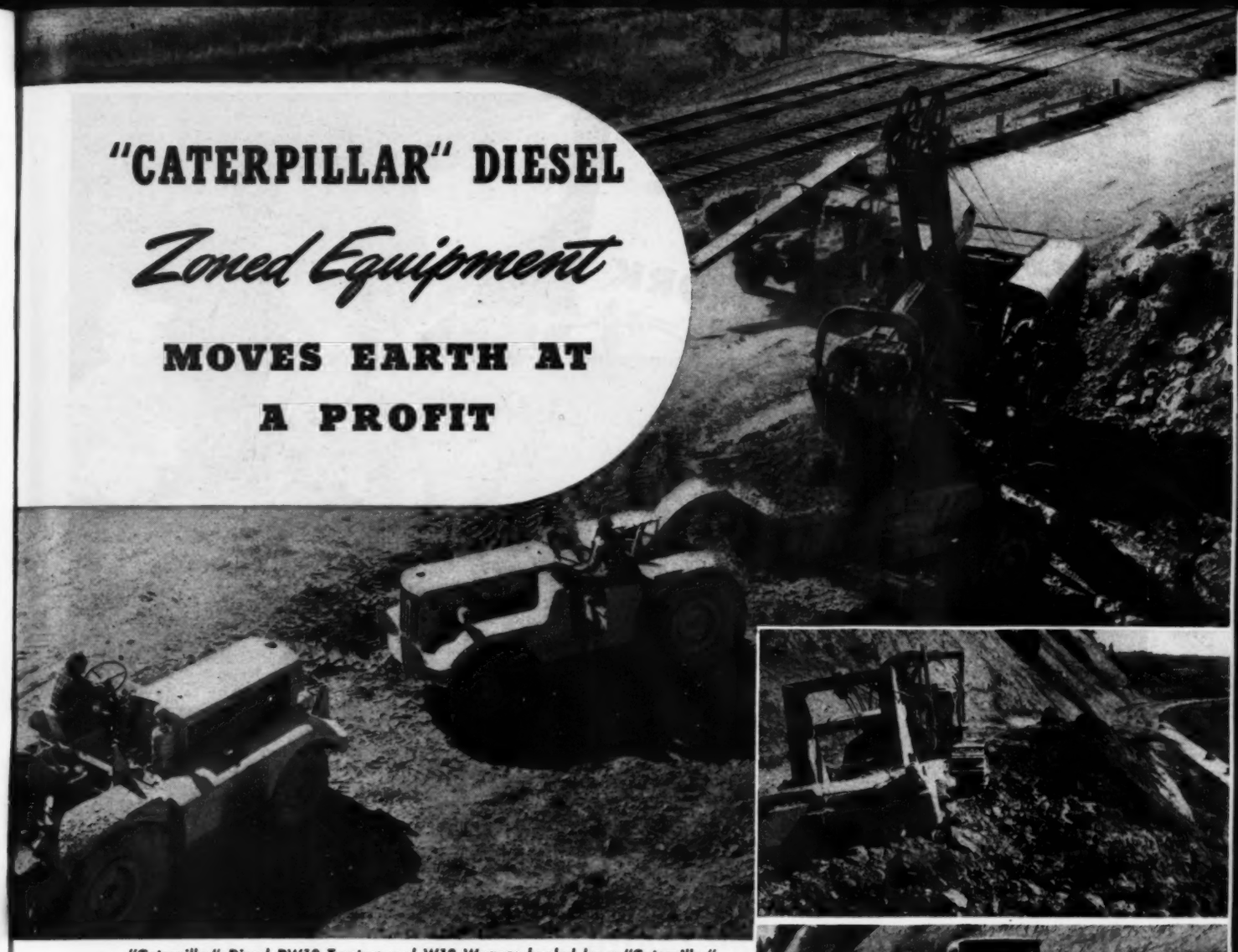
AVIATION ACCESSORIES

"CATERPILLAR" DIESEL

Zoned Equipment

MOVES EARTH AT A PROFIT



"Caterpillar" Diesel DW10 Tractors and W10 Wagons loaded by a "Caterpillar" Diesel-powered Lorain shovel, on the Woodland-Martin's Bluff highway job.

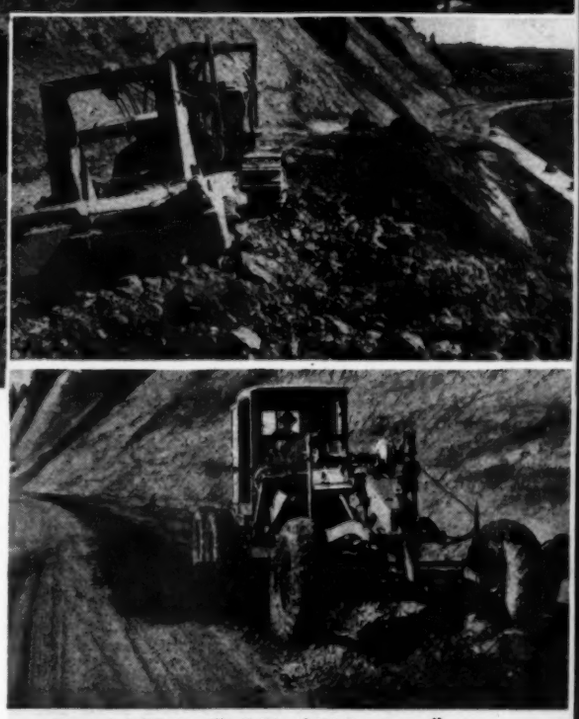
LEONARD & SLATE, Portland, Oregon, contractors, used the "Caterpillar" *zoned equipment* system on a recent highway widening job between Woodland and Martin's Bluff, Washington.

Husky "Caterpillar" Diesel Tractors—D8s and D7s—did the ripping and bulldozing. A "Caterpillar" Diesel-powered Lorain shovel loaded "Caterpillar" W10 Wagons, hauled to the fill by "Caterpillar" Diesel DW10 Tractors, rolling fast on rubber. And the fine grading was done by "Caterpillar" Diesel No. 12 Motor Graders.

It's being proved every day that most modern earthmoving jobs need *both* track-type and wheel tractors to move most yards in shortest time. Nothing can take the place of the D8 when it comes to tough 'dozing and scraper-loading work. But more and more owners are praising the speed, power, easy steering and excellent brakes of rubber-tired "Caterpillar" Diesel DW10 Tractors on the longer hauls and faster haul roads.

"Caterpillar" doesn't take sides. It builds *all* kinds of earthmoving machines—builds them with "Caterpillar" quality—to do the job at LOWEST COSTS ON EARTH.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



(Upper) A "Caterpillar" Diesel D8 Tractor pulls ripper through rocky ground.

(Lower) Fine grading is done by a "Caterpillar" Diesel No. 12 Motor Grader.

CATERPILLAR

REG. U.S. PAT. OFF.

ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING
EQUIPMENT

DIESEL

The discharged veteran wears this emblem. Remember his service and honor him.

HOT OIL FAST!
..with Less FUEL..WATER..WORK

Handle that road oiling contract more profitably with a Cleaver-Brooks Tank Car Heater

The quicker you get the oil or asphalt in the tank car on the siding up to application temperature and flowing into the distributors—the faster your road crews can get going and finish the job.

With a Cleaver-Brooks Tank Car Heater you can have hot, dry steam flowing to car coils from a cold start in 20 minutes or less. And you can keep going all day with the least work and bother because a Cleaver-Brooks Tank Car Heater requires less fuel and water.

Perfected — highly efficient — you can tow it with car or truck to tank car siding, construction site, material yard or other locations where you need steam.

The famous Cleaver-Brooks four-pass fuel travel means low fuel consumption; the turbine type condensate return system cuts water loss — every drop of condensate goes back to the heater under pressure.

Built for full capacity — full time work — Cleaver-Brooks Tank Car Heaters will give you the most in production hours on the job. Write for bulletins and complete information.

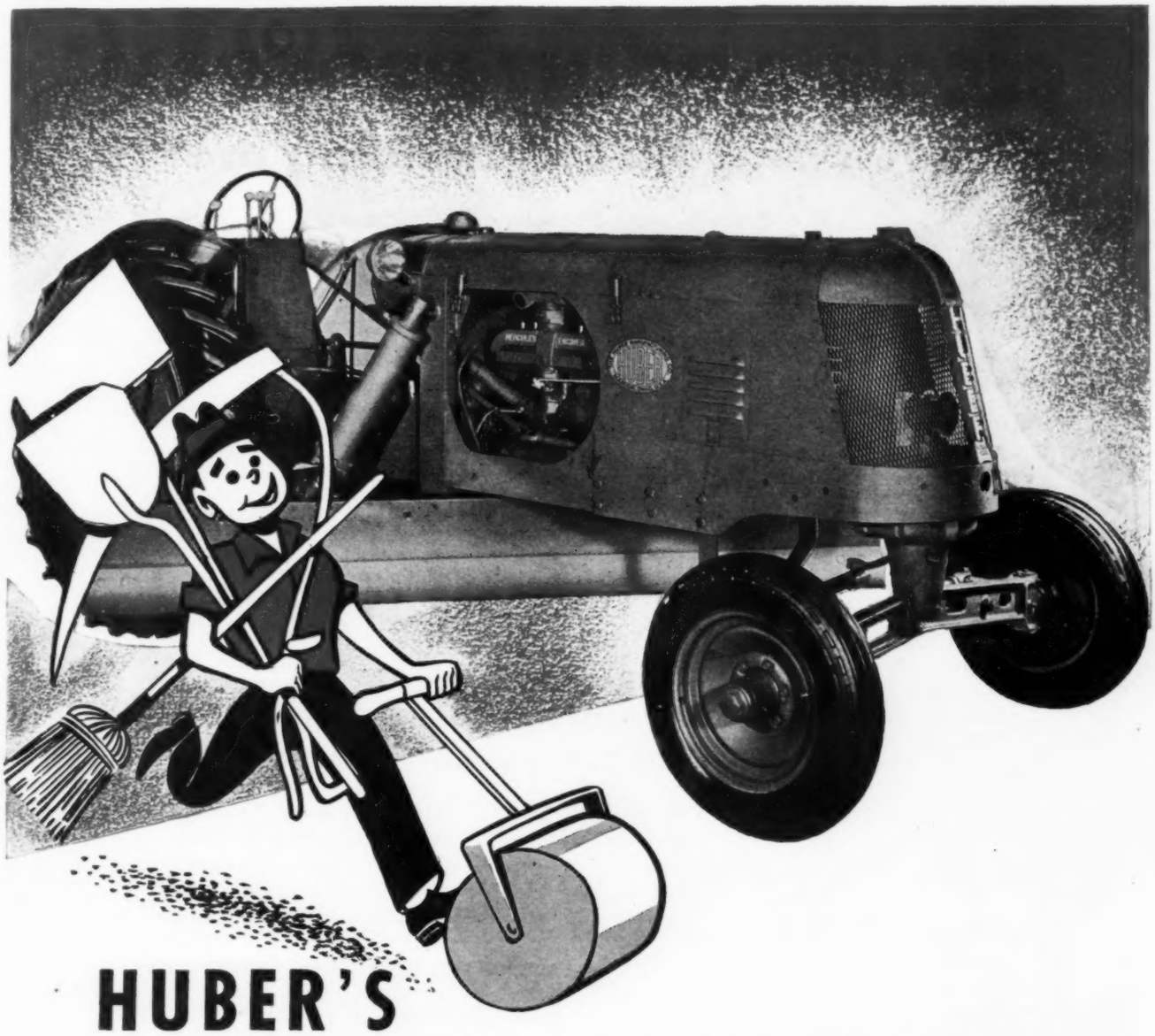
CLEAVER-BROOKS COMPANY
329 East Keefe Avenue, Milwaukee 12, Wisconsin

Write On Your Business Letterhead . . . For the Bituminous — mix Calculator — a ready reference slide rule showing weight of mix needed in lbs. and tons in relation to width and depth of area to be covered.

Cleaver-Brooks

PIONEERS AND ORIGINATORS OF

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM-PLANTS



HUBER'S
ONE-MAN MAINTENANCE CREW

Wouldn't you like to have a street, highway, and airport maintainer that readily becomes a mower, bulldozer, snowplow (V-type or one-way), broom, patch-roller, and lift-loader? You can get this type of a versatile worker in a HUBER MAINTAINER—all "wrapped up" in a single investment. We have nicknamed it the "HUBER ONE-MAN MAINTENANCE CREW" because only one man is needed to put it through its many paces. Put the HUBER MAINTAINER high on your MUST SEE list as soon as your local distributor gets one. You'll be glad you did.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER MAINTAINER

ALSO 3 WHEEL AND TANDEM ROLLERS

CECO'S 3-POINT PROGRAM
for surer, bigger road building profits

HERE IS A 3-POINT SERVICE THAT CAN BE A REAL WINNER FOR YOU

1

Say good-bye to guesswork bidding. Ceco supplies you with accurate data. You can bid to get the job . . . and bid to make money on it.

2

Ceco Engineers do your detail work. They supply you with blueprints on reinforcing and other materials . . . help make your construction job easier.

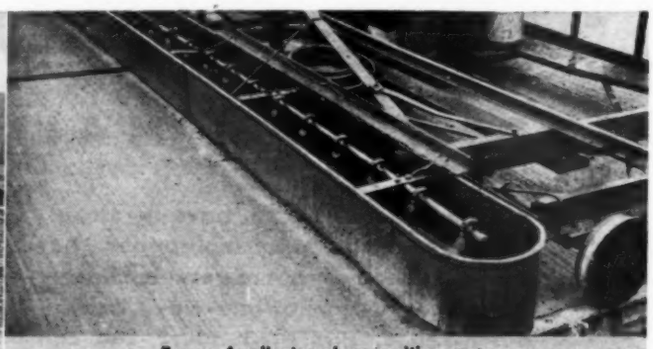
3

Your whole operation is streamlined. In one complete order you can specify everything you need. You get your materials where you want them . . . when you want them.

A WINNING Combination for You
CECO ENGINEERING + CONSTRUCTION KNOW-HOW

Ceco Road Building Materials are engineered to a quality and precision that makes construction worry-free. But there's more than that. Ceco Engineers have years of practical construction experience behind them. All that wealth of know-how is yours. Call any one of 23 offices, strategically located coast to coast. You can always depend on Ceco.

Welded Fabric, electrically welded at intersections, makes ideal reinforcing.



Cecure Applicator gives positive, even application of Cecure compound.

Typical Ceco Highway Products

- Welded Wire Fabric
- Reinforcing Steel
- Dowel Bar Supports and Sockets
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- Load Transfer Devices
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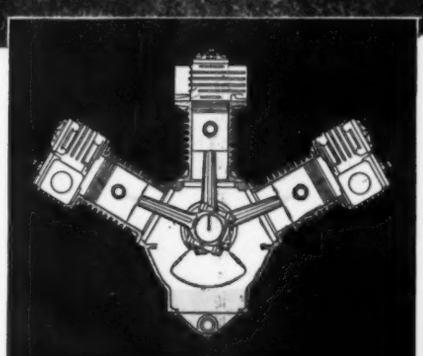
In construction products **CECO ENGINEERING** *makes the big difference*

AIR PLUS JAEGER COMPRESSOR

Quiet Please!-Tobacco Asleep
25 Million pounds of finer, lighter, naturally milder
tobacco aging here for Lucky Strike cigarettes
JAEGER
ATLANTIC BITULITHIC CO. WASHINGTON
THIS QUIET
COMPRESSOR DOES ITS JOB AT
20% TO 30% SLOWER PISTON SPEED (800 r.p.m.)

Because they are precision built and balanced, and develop full efficiency at slower piston speed, Jaeger "AIR PLUS" compressors are much quieter and cooler running, deliver more air per pound of fuel with less wear on engine and compressor. Fuel tank is recessed and protected inside the main frame, permitting use of 30% to 50% larger air receivers for less frequent engine acceleration, further fuel economy and cooling of the air . . . These are some of the reasons why compressor users are demanding "AIR PLUS." Ask for complete Catalog JC-5.



Compressor unit is a balanced "W" with interchangeable precision parts, micro-honed cylinders, force feed lubricated thruout.

THE JAEGER MACHINE CO., Columbus 16, Ohio

REGIONAL OFFICES:	8 E. 48th St. NEW YORK 17, N. Y.	226 N. LaSalle St. CHICAGO 1, ILL.	235-38 Martin Bldg. BIRMINGHAM 1, ALA.

JAEGER *Engineered* EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

DUST-FREE HIGHWAYS

. . . . ARE BORN IN DUST!

Most Road Building Operations—Clearing, Excavating, Filling, Grading — Impose Many Barriers to Efficient Air Cleaner Performance.

- Severe dust conditions
- High air demand
- Constant vibration and shaking
- Frequent, long periods of angle operation.

Donaldson Heavy Duty Oil-Washed Air Cleaners take these unusual conditions in stride. They provide high air cleaning capacity, generous dirt holding ability, and dust removal efficiency of close to 100% even under adverse operating conditions. Furthermore, when fitted with the Donaldson Collector Pre-Cleaner they cut servicing time. As a result most manufacturers of heavy duty diesel and gas engines used in road building machinery have chosen Donaldson Cleaners as standard equipment.

IF YOU HAVE AN AIR CLEANING PROBLEM THAT REQUIRES "ENGINEERED TO THE JOB" DUST PROTECTION . . . WRITE US.

World's first and largest manufacturer of air cleaners for heavy duty equipment.

Sales Engineers: CHICAGO — DETROIT — CLEVELAND

DONALDSON CO., INC.

666 PELHAM BLVD. ST. PAUL 4, MINN.

DONALDSON Oil-Washed AIR CLEANERS

10 *reasons why* Heil Cable Dozers

move more "pay dirt" at less cost

1 The center-lift construction assures full visibility for operator. He works faster and more accurately, for 60% of moldboard is visible at all times.

2 Ease of operation is assured because control lever is located at driver's side.

3 Lifting mechanism is mounted on tractor frame—heavy reinforcing fish plates attached to transmission case and engine frame carry load of overhead center lifting mechanism.

4 Heil design transfers imposed load to dead axle — no strain on tractor frame.

5 Short push arms at center balance point provide greater down-pushing pressure on blade cutting edge.

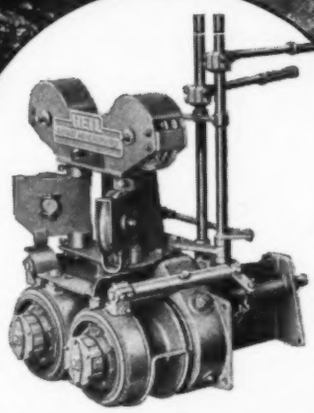
6 Down pressure at center point of tractor keeps track at full length on ground, utilizing entire drawbar horsepower of tractor.

7 Blade can be disconnected from tractor easily. Simply remove one sheave pin and four small nuts—tractor can be backed away from blade with cable remaining intact.

8 Mounting frame leaves whole track frame clean — does not cause dirt to accumulate at idler rollers.

9 Fast mounting job is possible because Heil equipment has a minimum of pieces and weight. Parts are interchangeable—which means less inventory.

10 Heil streamlined design does not detract from the tractor's appearance. All functions are coordinated to give you smoother operation, quick response to controls, and a better, cleaner, all-around job of dirt-moving at lower cost.



Dependable Power Control Units for All Makes of Tractors

Smooth operating brake and clutch assemblies eliminate shocks and jerks; the large drums run cool; sheaves are designed to reduce wear on cables. Fingertip control gives fast response for bigger yardage. Designed for all types of cable-operated equipment, on all makes of tractors.

Write for bulletins.

A Heil Cable Dozer gives you faster action, greater flexibility and handles the tough jobs easily.

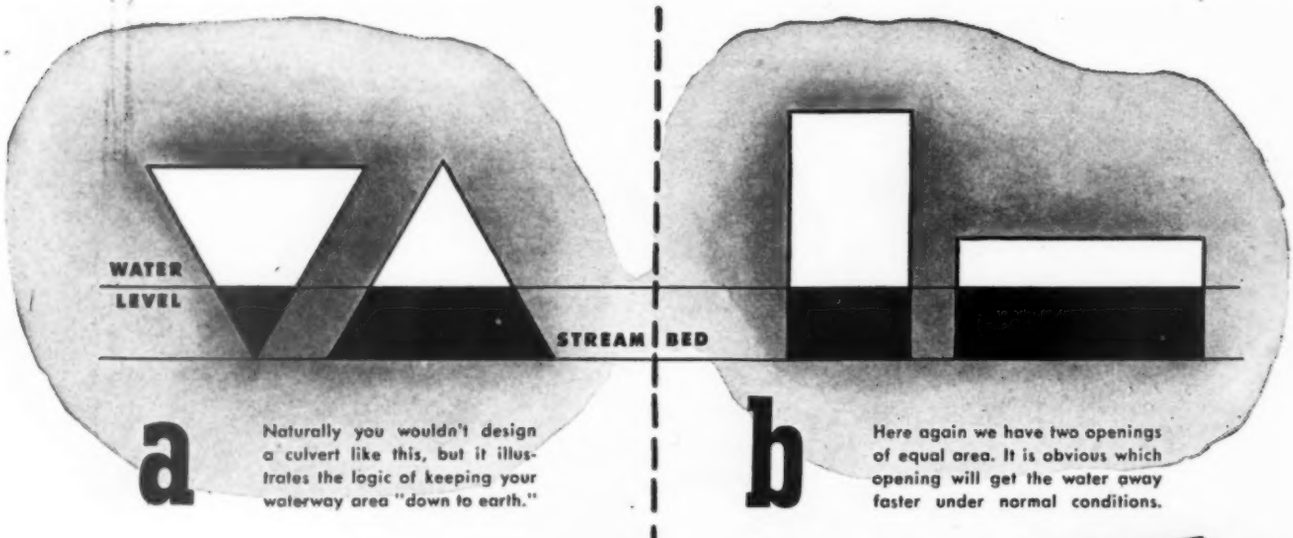
See Your INTERNATIONAL TRACTRACTOR DISTRIBUTOR

R-68

ARMY E NAVY

THE HEIL CO.

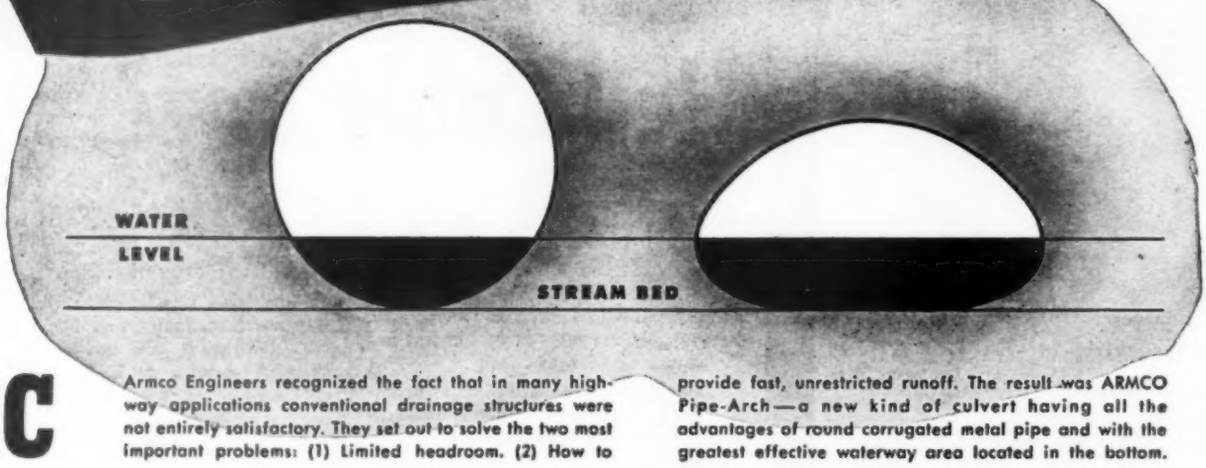
GENERAL OFFICES • MILWAUKEE 1, WISCONSIN



a Naturally you wouldn't design a culvert like this, but it illustrates the logic of keeping your waterway area "down to earth."

b Here again we have two openings of equal area. It is obvious which opening will get the water away faster under normal conditions.

"Down to Earth" drainage facts



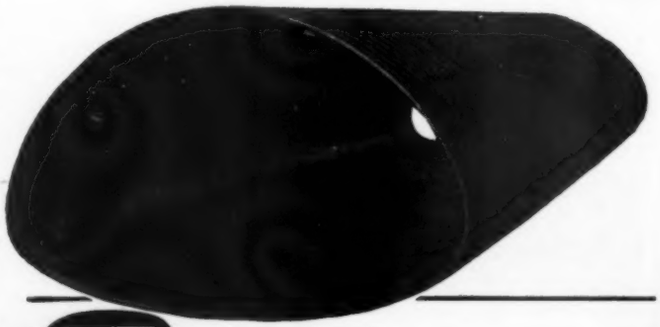
c Armco Engineers recognized the fact that in many highway applications conventional drainage structures were not entirely satisfactory. They set out to solve the two most important problems: (1) Limited headroom. (2) How to provide fast, unrestricted runoff. The result was ARMCO Pipe-Arch—a new kind of culvert having all the advantages of round corrugated metal pipe and with the greatest effective waterway area located in the bottom.

Thousands of installations and exhaustive tests are convincing evidence that ARMCO Pipe-Arches bring new economy and efficiency to highway drainage.

This corrugated pipe-arch is fabricated into a single unit and shipped as a complete structure ready for quick installation. When necessary, long lengths may be joined by sturdy band couplers. An unskilled crew can make an average installation in less than an hour, using only simple tools.

ARMCO Pipe-Arches are the safe, practical answer to problems of limited headroom. They have ample strength under shallow cover to withstand the impact and vibration of heavy traffic. Uneven foundations are no hazard. And because ARMCO Pipe-Arches "fit the ditch" there is less excavation. Drainage efficiency goes up and the wider bearing area insures added safety in soft ground.

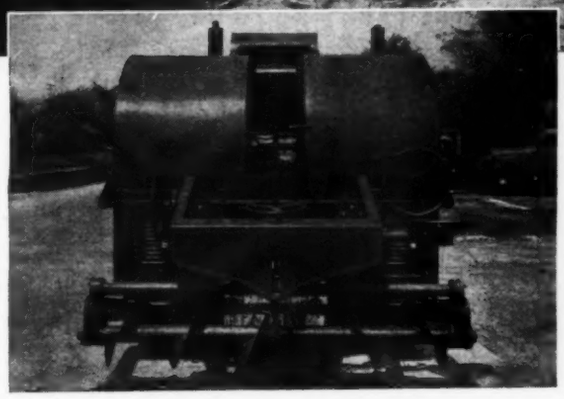
ARMCO Pipe-Arches have all the proved advantages of full-round corrugated pipe plus a functional design that meets specific highway drainage requirements. Write for complete information. Armco Drainage & Metal Products, Inc., and Associated Companies, 2605 Curtis St., Middletown, Ohio.



ARMCO **ARMCO Pipe-Arches**

Moto-Paver

THE COMPLETE TRAVELING MIXER AND PAVER



Rear view, with strike-off bar removed to show the patented spreading arrangement and controls

- ★ SELF-CONTAINED ★ SELF-PROPELLED
- ★ MIXING CAPACITY 100 TO 120 TONS PER HOUR
- ★ PAVING SPEED 4 TO 50 FT. PER MIN.
- ★ ROAD SPEED UP TO 18 MILES PER HOUR

MIXES, SPREADS AND LAYS ANY TYPE OF MIXED-IN-PLACE BITUMINOUS MATERIAL TO ANY ROAD WIDTH, THICKNESS AND CROWN CONDITION

The Moto-Paver does the *complete mixing and paving job.* No separate loader or spreader is required—no trailer to haul the machine from one job to another.

This highly flexible mobile plant is especially adapted for resurfacing work on county roads and city streets, because of the different types of pavement that can be produced with it, and because it can be quickly moved from one job to another under its own power. The Moto-Paver is also highly efficient on new construction.

Bulletin MP-46, giving complete information and specifications, will be sent on request.

HETHERINGTON & BERNER INC. • 721 KENTUCKY AVENUE, INDIANAPOLIS 7, INDIANA

Hetherington & Berner

BUILDERS OF PORTABLE AND STATIONARY ASPHALT PLANTS OF ALL TYPES AND CAPACITIES

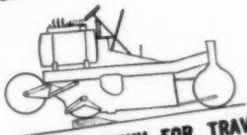
Another ADNUN BLACK TOP PAVER First!

FASTER . . . Easier job-to-job travel . . . with the ADNUN Carryall

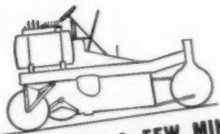
ADNUN leads again! Now between-jobs travel is a much simpler, faster operation than ever before with the Adnun Carryall. Two pneumatic, rubber-tired wheels on heavy, retractable frames lift the rear rolls clear of the ground—ready for fast towing or self-propelled travel with the powerful Adnun front-wheel drive. On the job, Adnun Carryall wheels lock up and out of the way of paving operations. Either putting the wheels down for travel or up for work is a quick, easy job. . . . Done on the spot without jacks or other special tools. Where long strips of cold material are being laid, and job conditions prevent paving in both directions, the Adnun Carryall can save hours per job in getting back—fast—to start a new strip. Adnun Carryalls can be quickly attached to your present Adnun Black Top Pavers, or furnished already installed on new machines. Give serial numbers of your Adnuns when ordering.

THE FOOTE COMPANY, INC.
1936 State Street **Nunda, New York**

UP AND OUT OF THE WAY ON THE JOB
In retracted position, the Adnun Carryall gives plenty of clearance and is well out of the way during black top paving operations.



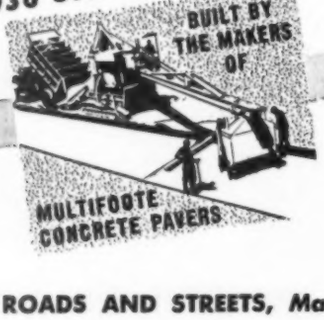
EASY TO PUT DOWN FOR TRAVELING
Just back the rolls of your Adnun onto a block, drop the Carryall wheels and insert the lock pin. . . . You're ready to travel! And no trailers or ramps are necessary.



READY TO GO IN A FEW MINUTES
There's nothing complicated about using the Adnun Carryall. . . . Only a few minutes required to put your Adnun on the job, or get it set for fast towing or self-propelled travel.

Four Army-Navy "E" Awards for Production Excellence!

ARMY E NAVY



ADNUN
TRADE MARK REGISTERED
BLACK TOP PAVER

NEW IMPROVED SUPER-LUBRICANT

FOR TOUGHEST LUBRICATION JOBS IN ALL INTERNAL COMBUSTION ENGINES

BASICALLY DIFFERENT... SPECIALLY REINFORCED!

- Resists Formation of Sludge, Lacquer, Carbon
- Removes Hard Carbon
- Stronger Protective Film
- Non-Corrosive—Safe
- Keeps Piston Rings Free
- Adds Power, Saves Fuel, Saves Wear and Shut-down Time

Accepted by Leading Engine Manufacturers as a Superior Lubricant for Heavy Duty Engines.

LION Naturalube D.H.D. OIL

Naturalube D.H.D. is made from a rare and basically different crude oil. This unusual crude gives D. H. D. a much stronger protective film than ordinary oils . . . greater ability to penetrate to all moving parts . . . greater adhesiveness . . . and the natural ability to remove hard carbon deposits from valves, rings and pistons. In addition, Naturalube D. H. D. is reinforced to prevent the deteriorating effects of heat and oxidation, and to resist the formation of harmful sludge and lacquer. It is also non-corrosive — safe!

When you use D. H. D., engines are cleaner . . . rings, valves and pistons operate freely for longer periods . . . filters, screens and oil lines do not clog and prevent proper lubrication of all parts. Because Naturalube D. H. D. removes carbon, there is no hard-carbon scuffing. The general performance of your engine is improved, operating and maintenance costs are lower, and shut-down time is held to a minimum. D. H. D. saves wear, adds power, saves fuel. Try it.

For normal service where D. H. D. is not required, use Naturalube Motor Oil (not so heavily reinforced).

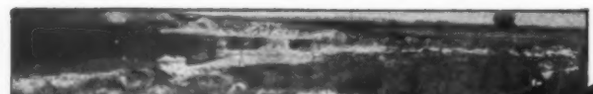
POSITIVE MONEY-BACK GUARANTEE

Your money returned if you don't believe Naturalube to be the best oil you ever used.

LION PETROLEUM PRODUCTS

LION OIL COMPANY EL DORADO, ARKANSAS

We tilt the idlers...



Here's a close-up of a PIONEER troughing idler. It's one of many reasons why PIONEER conveyors are most efficient for carrying all types of material for long or short distances.

Each PIONEER idler is a unit in itself . . . complete and interchangeable. The inverted angle base is strong, light in weight, and self-cleaning. Labyrinth seals retain the grease and protect the TIMKEN tapered bearings from dust and grit.

PIONEER conveyors are furnished assembled in standard sections or knocked down for assembly on the job. Portable conveyors, often used as auxiliary units, are ideal for filling cars or building stock piles. PIONEER portable conveyors are mounted on a new conveyor truck with hydraulic raising mechanism. They are easy to move and will save you time and money on every job.

Let PIONEER conveyors carry the load and you can be certain of a constant, smooth flow of material at lower cost per ton. Write today for complete details.

WE TILT THE IDLERS in the direction of belt travel for constant belt alignment. Feeding toward the center, the belt runs straight and true.

PIONEER ENGINEERING WORKS, INC.
1515 CENTRAL AVENUE • MINNEAPOLIS 13, MINNESOTA

Engineers and Manufacturers of Quarry—Gravel and Mining Machinery

PLAN WITH

Pioneer

ENGINEERING WORKS

When you need **PULL**

EUCLIDS

have it!

Advantages of EUCLID Planetary Drive Axle

The driving parts of the Euclid axle are: (a) — a primary reduction consisting of conventional spiral bevel ring gear, pinion and differential (1); (b) — secondary reduction of two floating planetary gear sets (2) each made up of a sun gear, three planetary gears and internal ring gear (3). The only parts carrying the full driving load are the outer drive axles and hub caps (4). The inner axles (5) carry less than 1/5 of the load delivered to the driving wheels (6). The use of the planetary reductions makes possible minimum gear reductions in the transmission and differential and results in much lighter loads being imposed on all parts between the planetary gears and engine.

Full-floating drive axle has exceptional strength

One reason for the wide use of Euclids on tough, off-the-highway hauls is the double reduction planetary drive axle used in both Rear-Dump and Bottom-Dump Euclids.

By this system of gear reduction, tremendous pulling power is attained with comparatively little burden on the intermediate driving parts. This results in greatly prolonged life of axle driving parts.

The Euclid drive axle is full-floating — all of the rear axle load being carried on heavy-duty tapered roller bearings mounted on hollow spindles which keep axle shafts and gears entirely free from vehicle and payload weight. The entire drive axle assembly is precision built and all working parts are completely enclosed in an oil bath.

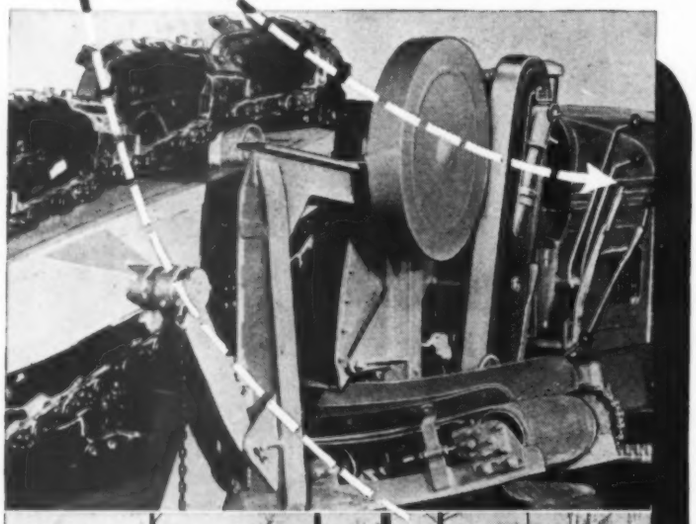
The dependable performance of the Euclid axle — its strength and capacity — is unequaled by any other axle in heavy duty hauling equipment. It is an important factor in the long life and efficiency of Euclids.

The EUCLID ROAD MACHINERY Co. · · · CLEVELAND 17, OHIO

simplicity

OF CONTROL —

Yet Maximum Range of Speeds and Feeds!



The Buckeye Model "410" Trencher is noted for its simple controls, yet it offers the operator:

All obtained by shifting easy-to-operate automotive type levers.

- 36 CUTTING FEEDS (.46 to 38 feet per minute)
- 6 TRAVEL SPEEDS—5 FORWARD, 1 REVERSE (.336, .59, 1.14, 2.05 and 2.67 M.P.H.)
- 4 BUCKET LINE SPEEDS (31.54, 106, and 189 feet per minute)

Check the many other features that make this outstanding trencher so popular with:

GENERAL CONTRACTORS—ROAD BUILDERS
UTILITIES—MUNICIPALITIES

COMPACT, MINIMUM WEIGHT, WITH BIG TRENCHER STAMINA. — Width (exclusive of shiftable conveyor) only 4'9". Height only 6'10". Bearing Pressure only 6 lbs. per sq. in. Superior design, expert workmanship and quality construction throughout.

VERSATILE PERFORMANCE. — Can turn in its own length. Digs trench from 18" to 24" wide. Digs trench up to 6' deep (7'6" optional).

Get complete specifications on Buckeye Model "410" Trenchers from your nearest Buckeye Dealer, or send for Bulletin No. 45, before you figure your next trenching contract.

THERE'S A COST-CUTTING BUCKEYE TRENCHER FOR EVERY TRENCHING NEED.

BUCKEYE TRACTION DITCHER COMPANY
FINDLAY, OHIO

built by **Buckeye**

CONVERTIBLE SHOVELS—BULLDOZERS—ROAD WIDENERS
TRENCHERS—MATERIAL SPREADERS—R-B FINEGRADERS

The Inside Story of All-Wheel-Drive

On the surface, Marmon-Herrington *All-Wheel-Drive* converted Fords may look very much like conventional trucks. But underneath there's a whale of a difference.

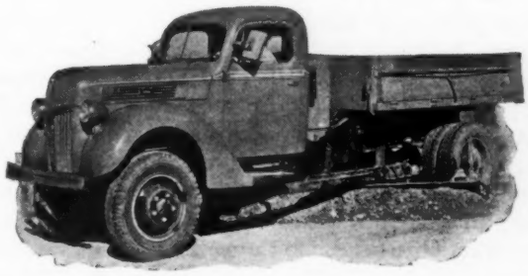
In place of the regular front axle, you'll find a sturdy driving axle that delivers live power and traction directly to the front wheels. You'll find also a rugged, dependable auxiliary transmission, that increases total number of speeds to 8-forward and 2-reverse. Thus, with an abundant flow of tractive power to *all wheels,* plus an exceptionally wide range of gear ratios, Marmon-Herrington converted Ford trucks are ready to transport maximum pay-loads—*wherever you want, whenever you want*—regardless of the most difficult conditions of weather and terrain.

Marmon-Herrington converted Ford trucks are mighty practical for regular highway work, too. *All-Wheel-Drive* power and traction gives them extra speed on hills and curves, greater safety on wet and slippery pavements.

Get the real performance facts on Marmon-Herrington *All-Wheel-Drive* Trucks—the big heavy-duty jobs as well as the Ford conversions. Ask any Marmon-Herrington dealer, or write the company direct.

MARMON-HERRINGTON CO., INC. • INDIANAPOLIS 7, IND.

ALL-WHEEL-DRIVE POWER AND TRACTION UNEQUALED FOR ROAD AND STREET WORK



Marmon-Herrington *All-Wheel-Drive* converted Ford trucks are ideal for all-around, year-around road and street work. These great trucks operate with equal efficiency in mud, sand, gravel and snow.

MARMON-HERRINGTON *All-Wheel-Drive*

There's an idea here For YOUR BRIDGE PROGRAM

KOPPERS PRESSURE-TREATED WOOD

This bridge illustrates a proven way to make your highway budget go further . . . and to utilize a maximum of local labor in construction.

The installation, which is adjacent to a large city, carries fairly heavy highway traffic. It has a center span of 33-ft., and two approach spans of 24-ft.; a 20-ft. driveway; and is built entirely of Koppers pressure-treated wood, assembled wth ring connectors and double-grip spikes. Stringers are framed to establish the vertical curve. A laminated sub-floor carries a bituminous concrete traffic surface.

The customer's comments are illuminating. He wrote: "These bridges are capable of carrying heavy modern traffic, are comparatively cheap in first cost, and we believe they will be very economical to maintain . . . They present a very neat appearance and for anything other than primary highways I feel that they represent a very desirable type of design for overhead highway bridges . . . With this design the structure can be changed to any dimensions desired."

We are equipped to pre-frame bridge members to your blueprints, prior to treating, so that little or no cutting and fitting is required on the job. Assembly can generally be handled with local labor and equipment. Ask for details and estimates. Wood Preserving Division, Koppers Company, Inc., Pittsburgh 19, Pa.

PRESSURE-TREATED WOOD

a KOPPERS Product

Where Headroom is Limited...

USE TONCAN IRON SECTIONAL PLATE PIPE ARCH

In small bridges, culverts and sewers where headroom is limited and greater hydraulic efficiency is demanded, use Toncan Iron Sectional Plate Pipe Arch. It provides a low wide arch 6 to 15 feet in diameter, supported by its own corrugated base, which moves water fast, keeps its level down and eliminates ponding.

These efficient waterways are made from Toncan Iron, an alloy of highly refined open-hearth iron, to which has been added twice as much copper as found in copper-bearing irons and steels, PLUS molybdenum. As a consequence, drainage structures made from this durable material resist rust and corrosion caused by soil, water or sewage.

These facts are important—but Toncan Iron Sectional Plate Pipe Arch offers other advantages, too. It is corrugated, which makes it 7 to 12 times stronger than flat plate of equal thickness. Shipped knocked down, it reduces freight, handling and hauling costs. Nut and bolt assembly assures fast erection on the job by unskilled labor using simple tools. And it is strong, flexible, able to stand tremendous loads without cracking or crumbling. The extra strength, plus the rust-resistance of Toncan Iron, makes it last for years, gives it 100% salvage value.

There is a Toncan Iron man near you. He will be glad to furnish you with full details about Toncan Iron Sectional Plate Pipe Arch. When it's drainage . . . call your Toncan Iron Man.

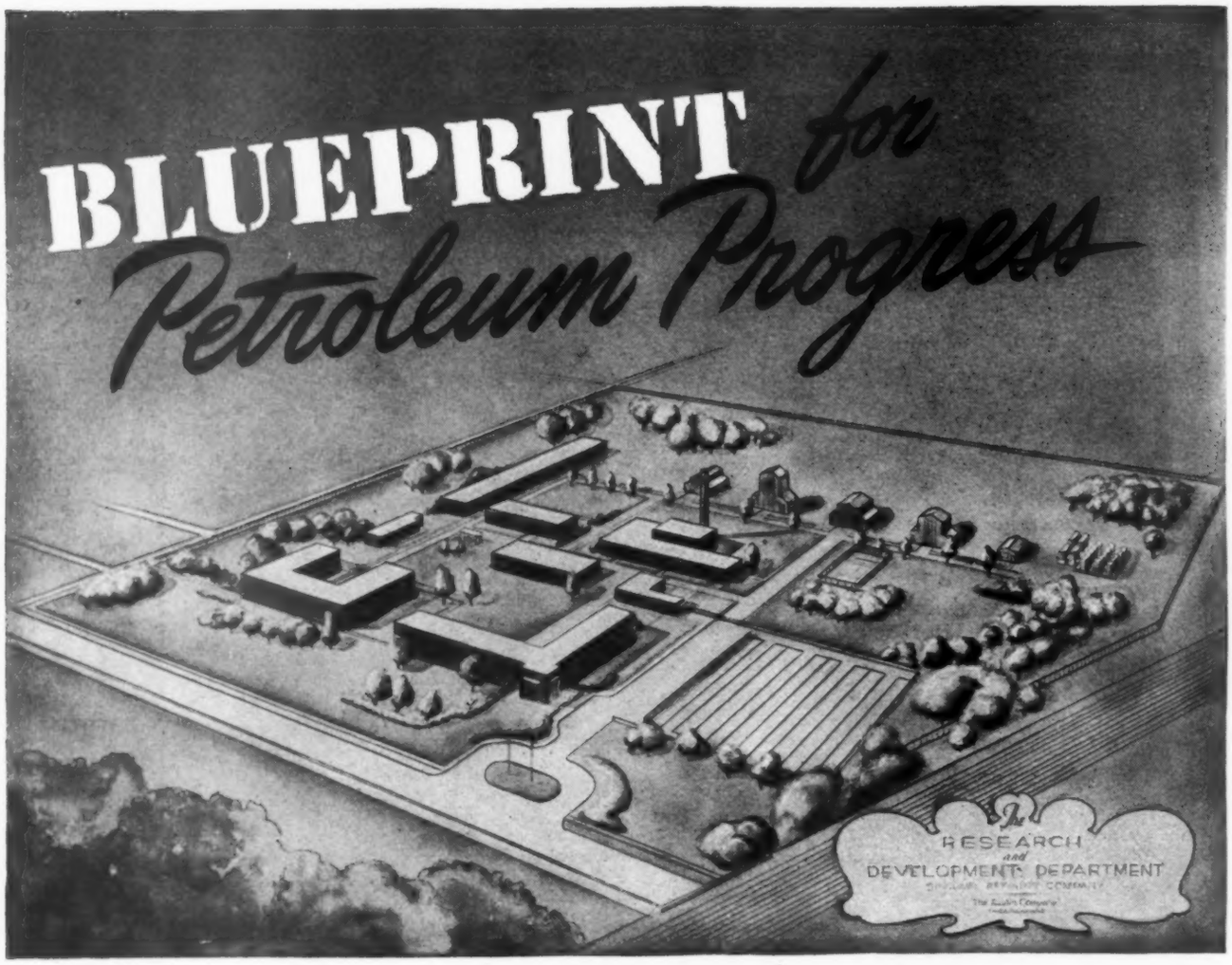
Here is a complete list of Toncan Iron Drainage Products

- CORRUGATED METAL PIPE
- PERFORATED CORRUGATED METAL PIPE
- CORRUGATED METAL PIPE ARCH
- CORWEL SUBDRAINAGE PIPE
- SECTIONAL PLATE PIPE
- SECTIONAL PLATE ARCHES
- SECTIONAL PLATE PIPE ARCH
- FLOOD GATES

Toncan Culvert Manufacturers' Association

1112 Standard Bank Building, Cleveland 13, Ohio

Toncan Iron . . . A product of Republic Steel Corporation



MOVING ahead with the resumption of peace-time industrial activity, Sinclair assures its customers of still greater product quality and performance with construction of an elaborate new research center at Harvey, Illinois.

In this great petroleum laboratory, recognized technological experts will have at their disposal the very latest facilities for the solution of the most difficult and specific lubrication problems. From the research work here, you may expect consistently top performance from Sinclair lubricants developed for every type of industrial use.

This research center is evidence that Sinclair means it when it says "Better Products . . . Better Service."

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

All You Need is a LICENSE TAG—

—to Haul on the Highway with MISSISSIPPI WAGONS!

* * *

Yes—and Mississippi Wagons are the ONLY hauling units of their type on which a license tag can be used!

Four-axle construction, made possible by the weight-transfer feature found exclusively on Mississippi Wagons, is the reason for their ability to operate efficiently, legally, and economically both ON and OFF the highway.

Four axles not only provide maximum flotation over soft ground on construction work, but serve to reduce axle-loadings for road and street travel. As a result, the Mississippi Wagon is the only bottom-dump hauling unit powered by a heavy industrial tractor that can haul payloads of 27,000 pounds on highways without exceeding the 18,000-pound axle-loading limit set by most states.

With all-round performance like this available, why make or carry a double investment in hauling equipment? Let a single investment in MISSISSIPPI WAGONS put you in a position to handle both construction and long-haul jobs . . . at costs that will enable you to meet and beat tough competition in the big days ahead.

COMPARE THESE FIGURES WITH YOUR PRESENT COSTS FOR HIGHWAY HAULING!

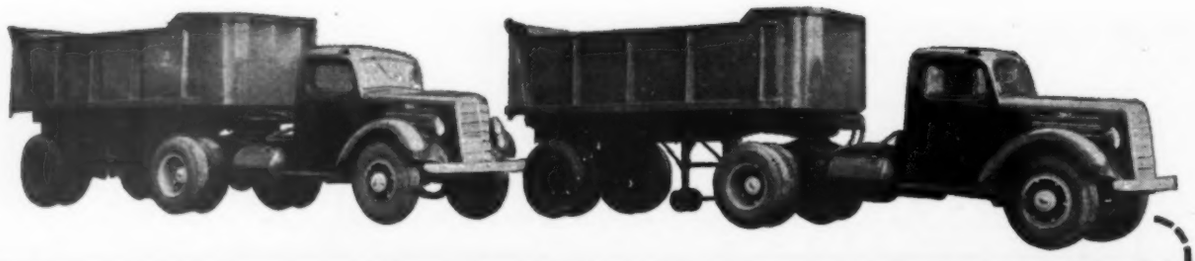
Following are the approximate costs per ton-mile for hauling with Mississippi Wagons:

LENGTH OF HAUL ONE WAY	TONS A DAY PER WAGON	COST PER TON-MILE
5 miles	202	3.5¢
10 "	115	3.1¢
15 "	81	2.9¢
50 "	27	2.6¢

The figures are based on a 10-hour day, an average speed of 20 m.p.h., payloads of 27,000 pounds, 10 minutes loading and dumping time per trip, and a total daily cost of $35.00 per Wagon, covering fuel, lubricants, driver's wage (average), reserves for depreciation, repair parts and labor, tire wear over abrasive concrete roads, insurance, social security, and miscellaneous expense.

M-R-S MANUFACTURING COMPANY, Jackson, Mississippi

MISSISSIPPI WAGON *The World's Most Modern Hauling Unit*



HEADED FOR *The Blue Grass Country*

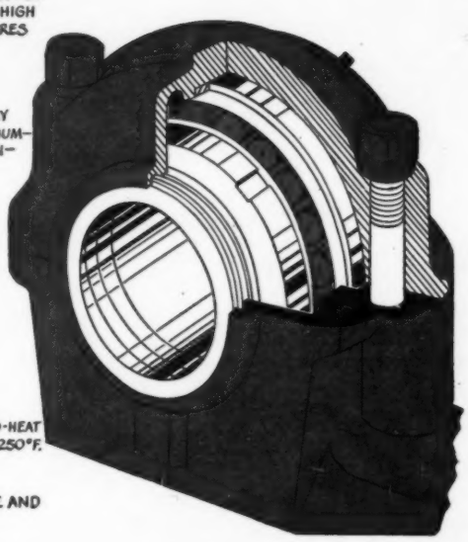
THESE two Hercules semi-trailer dump units — and a dozen more exactly like them — are the latest additions to the fleet operated by the **R. B.** Tyler Company of Louisville, Kentucky. Like all Hercules trailer units, these are completely integrated—trailer chassis, hoist and body—and designed to meet specific hauling and dumping requirements.

Recently put into service handling stone, gravel and sand on a 20-mile haul, these Hercules Huskies have already established new records for economy of operation. Hercules Huskies, tailored to your particular job, can provide the dependable, low-cost service you're looking for . . . . service that means profitable hauling and dumping. Bulletin HD-201 tells how and why . . . write today for your free copy. Address request to Department I.

View of 14-ton capacity trailer dump unit, equipped with exclusive Hercules "Center-Lift" hoist. Note special lightweight aeroplane type struts in underbody structure, designed for maximum rigidity and stability.

HERCULES STEEL PRODUCTS COMPANY . . . GALION, OHIO

STANDARD ENGINEERS NOTEBOOK


CALOL S.A. GREASE ASSURES GOOD LUBRICATION IN HIGH AMBIENT TEMPERATURES
CALOL S.A. GREASE MAY BE USED ON LOW-, MEDIUM- AND HIGH-SPEED ANTI-FRICTION AND PLAIN BEARINGS
WITHSTANDS RADIATED-HEAT TEMPERATURES OVER 250°F.
MINIMIZES DRIPPAGE AND LEAKAGE TROUBLE

New grease lubricates in extra hot conditions

Developed especially for bearings that must operate in radiated heat, new Calol S. A. (sodium aluminum) Grease has proved satisfactory in temperatures over 250° F. It has been tested by many operators on working machines in the field. In addition, it was given a series of tests in the Navy Ball Bearing Machine, operated at 10,000 rpm, with bearing temperatures maintained at a high degree.

Calol S. A. Grease is made from a special type base and selected oils that give it high heat-resistant qualities. In use, these qualities assure minimum drippage or leakage from bearings.

Although Calol S. A. Grease is ideal in a multiplicity of services, it is specifically adapted to the lubrication of low, medium and high speed anti-friction bearings used in all types of machines.

Made in three grades, 00, 0, and 1, by Standard of California, Calol S. A. Grease is available in 35-, 108- and 420-pound containers.

Tacky oils cut gear lubrication costs

Where bearings and gears must carry an extreme pressure load for a relatively long time because of slow operation, Calol Vistac Oils are recommended.

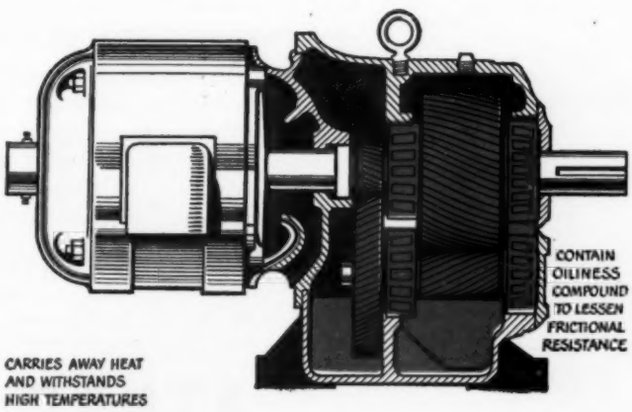
They are viscous and tacky, and have unusual ability to remain on bearing surfaces and resist film breakdown. Thus, a smaller quantity is required and many gear sets can be lubricated less expensively with Calol Vistac Oils than with ordinary oils.

A special oiliness ingredient in Calol Vistac Oils gives them low operating torque, thus minimizing frictional resistance while the extreme pressure additives used insures efficient operation under extremely heavy loads. They withstand high operating temperatures and readily carry away heat.

There are six grades of Calol Vistac Oils, providing the correct lubricant for all types of heavy-duty industrial reduction gear sets. Also excellent for the lubrication of air tools, they atomize quickly, are stable and minimize vapor trouble.

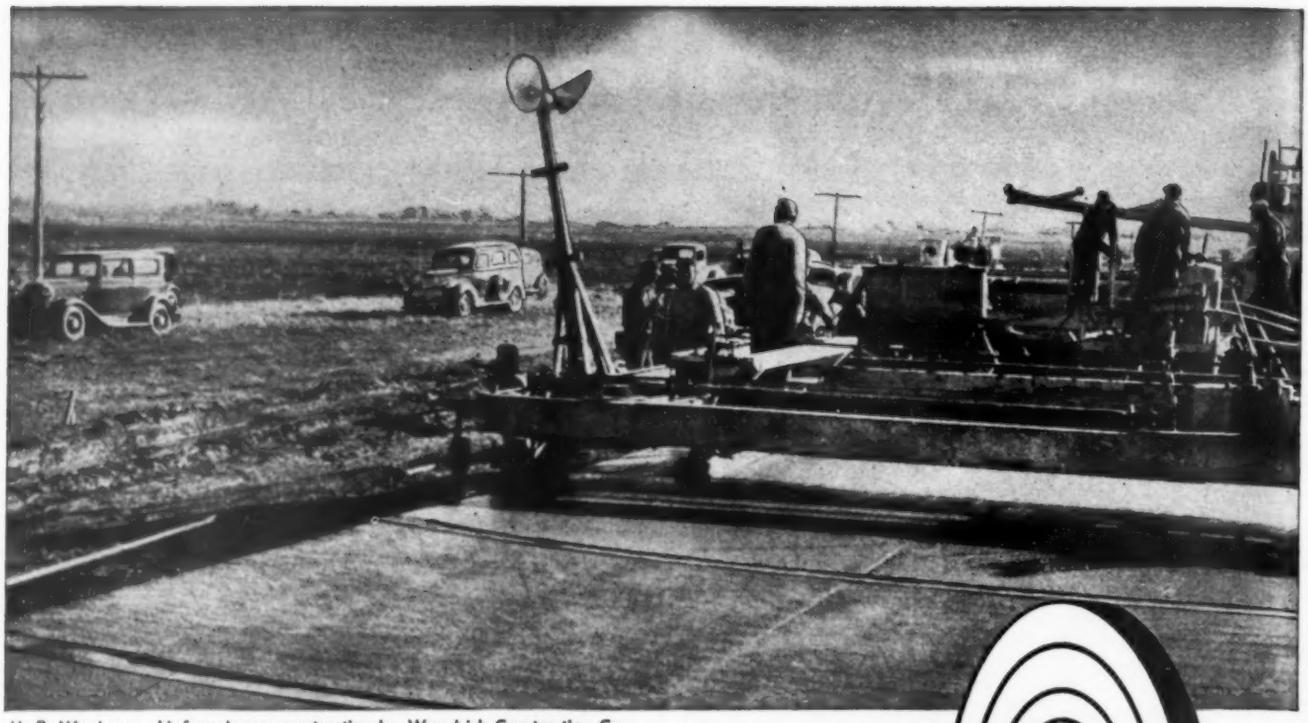
CALOL VISTAC OILS ARE VISCOUS AND TACKY AND REMAIN ON BEARING SURFACES

CALOL VISTAC OILS COME IN SIX GRADES. A SMALL QUANTITY MAINTAINS EFFICIENT LUBRICANT FILM



For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif.; The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.; The California Company, 17th and Stout Streets, Denver 1, Col.; Standard Oil Company of Texas, El Paso, Texas.

FOR EVERY JOB A **STANDARD OF CALIFORNIA** TEST-PROVED PRODUCT



M. P. Wynkoop, chief engineer; construction by Woodrich Construction Co., Minneapolis, operator for S. J. Groves and Sons, Minneapolis, contractors.

NORTH DAKOTA ENGINEERS...

NICK THE BULL'S-EYE OF AIR-ENTRAINMENT CONTROL!

THE TARGET: Entrained air, as measured by weight reduction of concrete, is specified by the North Dakota Highway Department to be within 3% to 6%. On a paving project west of Wahpeton, the engineers aimed at a concrete weight reduction of 4%.

THE SHOT: Prior to paving operations, weight of concrete without entrained air was determined by batch tests made with regular cement. The resulting weight was the basis for measuring the weight reduction of the air-entrained concrete. A cement interground with the precise amount of air-entraining agent needed for satisfactory field performance was insured by the use of Atlas Duraplastic.

THE HIT: Throughout the job, concrete weight reduction was constantly checked. At the end of the run, the tests revealed an overall average weight reduction of 3.6%... or only 0.4% off the target of weight reduction as a measure of entrained air!

THE DETAILS: An article describing the above job in detail will be sent upon request. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg., New York 17, N. Y.

OFFICES: New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco. **RS-D-34**

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

A UNIVERSAL ATLAS PRODUCT

AIR-ENTRAINING PORTLAND CEMENT

Makes Better Concrete at No Extra Cost

U. S. STEEL RADIO SHOW—*Sunday Evenings—Consult local newspaper for time and station*

EVERY ESSENTIAL FOR HEAVY-DUTY OFF-THE-ROAD HAULING ... YOU'LL FIND IN WALTER TRACTOR TRUCKS

300 H.P. WALTER TRACTOR TRUCK with 20 Cu. Yd. Side Dump Trailer. Carries up to 40 ton payloads, speeds 25 m.p.h. on the level, 8 m.p.h. on 10% grades; negotiates 15% and 20% grades. Highly maneuverable, easily handled.

- **HAUL HUGE LOADS.** Walter Tractor Trucks are hauling 20 Cu. Yd. Trailers—12 Cu. Yd. Dump Bodies, in toughest running conditions.
- **HAUL ON ANY TERRAIN, IN ANY WEATHER.** Walter Four Point Positive Drive provides 100% traction in all FOUR driving wheels to navigate mud, sand, steep grades and slippery surfaces. Three automatic locking differentials proportion power to each wheel according to traction. High ground clearance prevents "hanging."
- **TAKE HEAVY LOAD AND ROAD SHOCKS.** Ruggedly constructed throughout. Axle is a solid forging with final drive mounted above—not in it.
- **SHORT TURNING RADIUS.** Engine-ahead-of-wheels design shortens wheelbase, provides correct weight distribution, improves maneuverability.
- **WIDE GEAR RATIO.** Tractor Type Transmission provides wide gear selection—ample for any emergency. Suspended Double Reduction Drive increases gear capacity.
- **LONGER TIRE LIFE.** Three automatic locking differentials prevent wheel spinning, provide smooth traction. Low unsprung weight reduces jouncing and bouncing.
- **MINIMUM MAINTENANCE.** Users consistently report much higher availability than other trucks under similar conditions.

● Why try to get along with less when you get *complete* off-the-road haulage with Walter Tractor Trucks? They increase your yardage, speed your jobs and lower hauling costs all around. Their greater capacity enables you to work with fewer units, reducing congestion as well as expense. Write today for complete information.

200 H.P. WALTER TRACTOR TRUCK with 12 Cu. Yd. Back Dump Body. Hauls 20 ton payloads. Provides big truck capacity in short hauls, and congested areas. Fast, maneuverable.

WALTER
TRACTOR TRUCKS

WALTER MOTOR TRUCK CO.
1001-19 IRVING AVE.
RIDGEWOOD 27,
QUEENS, L. I., N. Y.

America's Finest Highways are Reinforced with

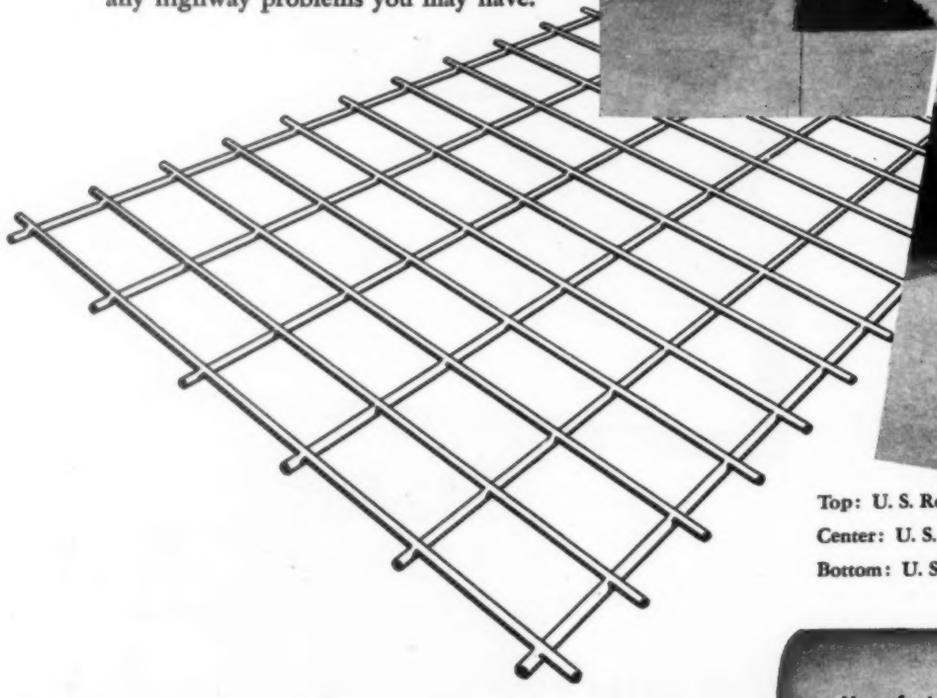
TRUSCON WELDED STEEL MESH

In every part of the country—North, South, East and West—there are smooth, easy-riding highways that have been made strong and durable with Truscon Welded Steel Fabric.

Actual installations have proved that Truscon Welded Steel Fabric assures long, economical life for concrete highways because it offers:

Resistance to cracking during setting period.
Tensile strength against subgrade friction.
Resistance to cracking due to warping.
Resistance to development and opening of cracks.
Resistance to slab separation.
Decrease of spalling and disintegration.

Be sure the roads you build have every one of these money-saving advantages by insisting on Truscon Welded Steel Fabric and associated products. The results will be smooth highways which will satisfy taxpayers and build greater prestige for you. A Truscon highway engineer will be glad to help solve any highway problems you may have.



Top: U. S. Route 1
Center: U. S. Route 30
Bottom: U. S. Route 250

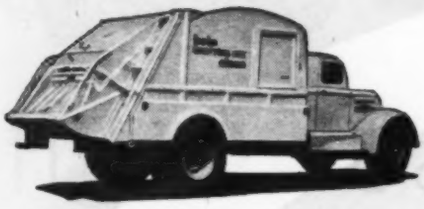
TRUSCON STEEL COMPANY

YOUNGSTOWN 1, OHIO • Subsidiary of Republic Steel Corporation

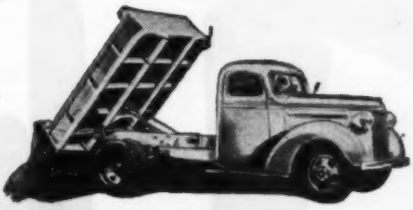
Manufacturers of a Complete Line of Welded Steel Fabric . . . Concrete Bars . . . Contraction Joints . . . Dowel Assembly Units . . . Curb Bars . . . Complete Steel Buildings.

When

BETTER BUILT FOR BEST PERFORMANCE

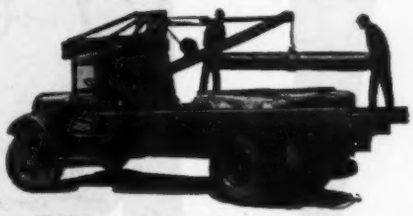


The Load Packer (patented) all enclosed garbage and refuse unit. Compresses loads hydraulically.

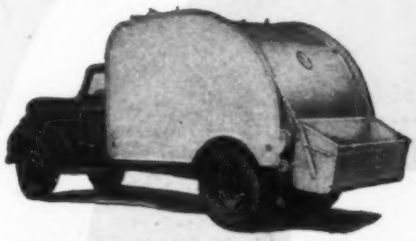


Type C12 Body and Model D6 or D7 Hoist. Dumping angle 55°.

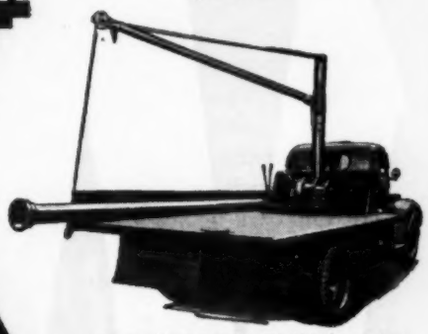
Repair Tower, two sections, insulated platform.



Telescopic boom Crane. Boom radius 8 to 20 feet.

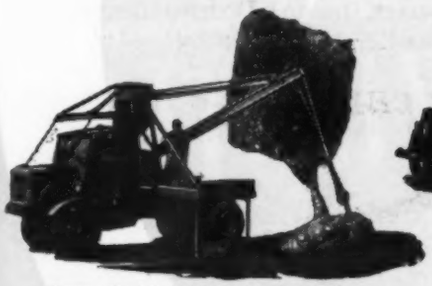


The new Bucket Loader, an all enclosed sanitary refuse disposal unit.

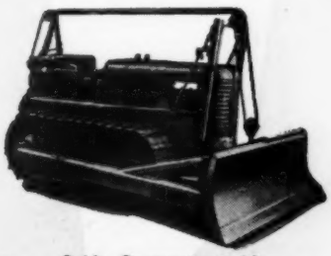


Crane Model 916 with Winch—also available with Dump Body.

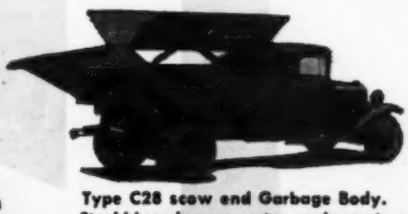
Special Garbage and Rubbish Body on semi-trailer.



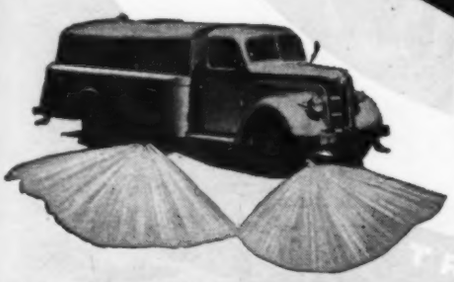
Crane Model 4812 for heavy parkway work.



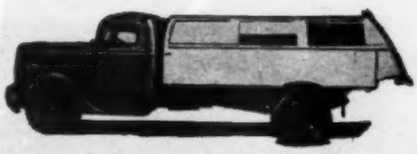
Cable Dozecaster with angling blade.



Type C28 scow end Garbage Body. Steel hinged covers extra equipment.



Street Flushers and Sprinklers.



Type C50 Garbage Body with sliding steel covers on each side.

TRADE MARK

GW TRADE MARK

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You—like thousands of other contractors—*know* that when trucks *fit your job*, they perform more efficiently, operate more economically, and last longer. . . . You know that you get better and more economical performance when the engine in your truck is "sized" for your loads. And you know that when the transmission, clutch, axles, and other units are of exactly the right size for the truck's job—you get *better* hauling at *lower* cost. . . . Dodge *Job-Rated* trucks fit your needs in many ways. They're engineered specifically for rugged, day-in-and-day-out service. Bodies are big and strong, and drivers like their comfort. . . . If you struggled through the war *without* the economy and dependability of trucks that fit your job—talk to Dodge owners, then to a Dodge dealer. NOW is a good time to switch to Dodge *Job-Rated* trucks.

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Handles any type material through spray bar lengths up to 12'-0". This unit can perform every maintenance function or for building of streets, roads, and secondary airports.

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Equipped with trailer equipment for fast and easy towing behind trucks. The powerful burner heats material to any desired temperature.

Standard Steel Works
NORTH KANSAS CITY, MO., U.S.A.

BASIC DESIGN ASSURES STEERING EXCELLENCE...LONG SERVICE

GEMMER STEERING

Note the basic design of the Gemmer Steering Gear. An hourglass worm engages gear teeth that *roll*. Anti-friction bearings are placed at all critical points. Absence of sliding friction provides highest efficiency—easiest transfer of power—easy steering with plenty of power for parking.

Design and construction are also exceptionally sturdy and compact—providing abundant strength, long endurance—ease of installation—saving of weight without sacrifice of overall capacity or steering arm angularity. Alloy steel forgings provide ample safety factor. Internal stresses are low.

A Gemmer Steering Gear will last, and *give satisfaction* for the life of the vehicle.

Simple:—Just a few parts—nothing complex—nothing to get out of order or require frequent adjustment.

Stable:—No "lost motion"—wear reduced to least possible minimum. Steering is always firm, responsive, positive with absence of rubbery feeling and—wander.

Gemmer Steering is demonstrating its worth in every type of automotive vehicle from the lightest passenger cars to the heaviest buses and trucks—in the road-building machinery, agricultural tractor, and marine fields.

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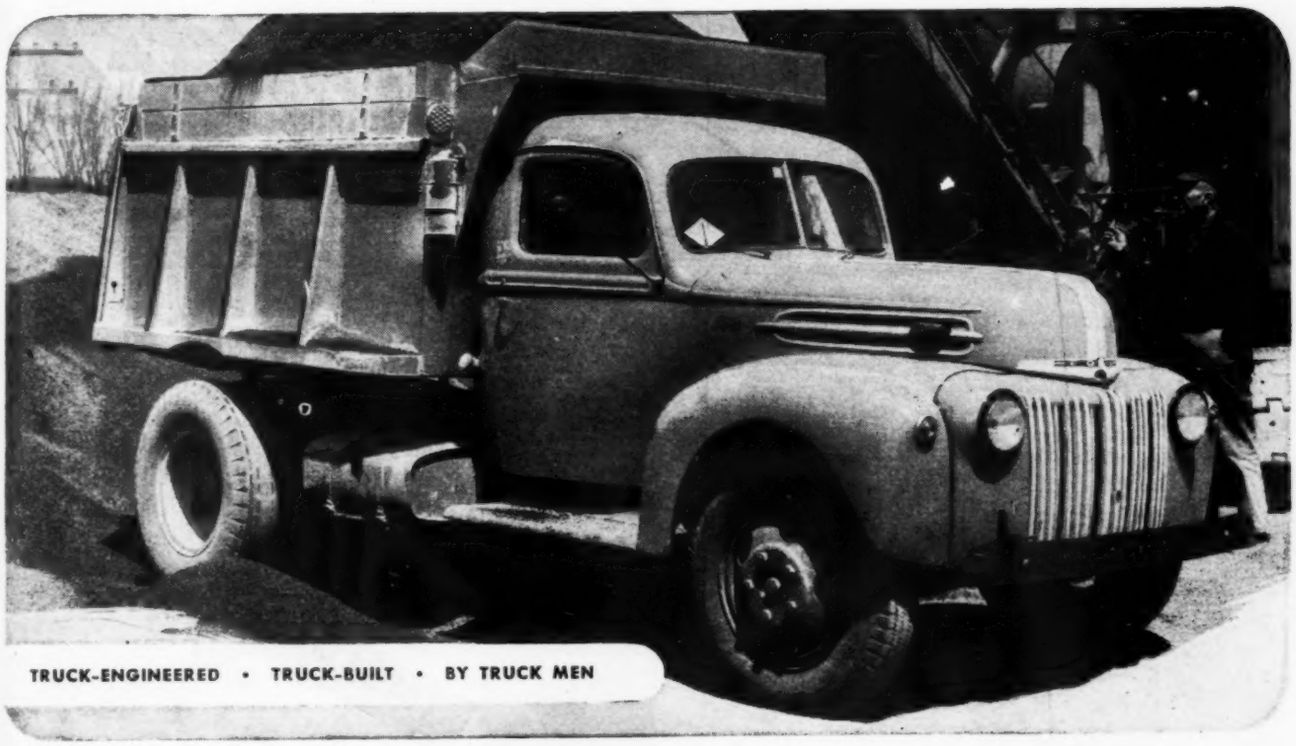
GEMMER . . . Pioneer of Efficient Steering

Better Trucks for YOUR Business!



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"This will give you an idea of what this 1942 Ford is doing," wrote Operator A. W. Avery, of Utica, New York, some months ago. *"Although you rate it at 1½ tons, I often carry much greater loads with this 5-yard body with side-boards. This has been its daily job in all kinds of weather!*

"I've used Fords since 1931—that's many years of satisfied service. I feel I've been lucky in having a Ford through these years."

Emergency pressures, which have been on the building trades, have made overloading almost a national custom. No truck engineer likes to see overloading, of course. But it has certainly proved one big fact for thousands of Ford Truck operators: Ford Truck endurance is a tremendous asset when the going gets really tough. Then Ford axle and clutch engineering prove their soundness; Ford frame strength and spring capacity prove their extra value; and Ford power speeds jobs to a finish.

There's a new Ford dump truck chassis in production now. Heard about it? Ask your Ford Dealer.

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FORD ADVANCED ENGINEERING!

THE FAMOUS V-8 ENGINE, for toughest service, now 100 HP, with NEW steel-cored Silvaloy rod bearings for trebled endurance • NEW Flightlight aluminum alloy 4-ring pistons for added oil economy • Tougher, rust-proofed valve springs • NEW moisture-sealed distributor • NEW coolant-saving radiator closure • Auto-balanced carburetion for still more thrifty power • Servicing simplified still further. And the rugged, thrifty 90 HP Ford six-cylinder engine, for stop-and-go jobs, with many important advancements, available in all except C.O.E. chassis.

Ford Truck rear axles—world-famous for load-lugging—provide generous reserve capacity • Light duty chassis have sturdy ¾-floating axle with triple-roller-bearing, straddle-mounted pinion; full-floating axles in all other chassis • 2-speed axle at extra cost in heavy duty units • Improved 4-speed transmission at extra cost in light duty chassis, standard in all others.

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YOUR wire rope will stay stronger longer — give you many extra months of efficient service — if you protect it with *Texaco Crater*. That's because *Crater* provides thoroughly effective lubrication both *inside and out*. It penetrates to the very core and prevents rotting — greatly reduces friction and wear resulting from rapid flexing.

You can depend on *Texaco Crater* to retain all its protective qualities under the most adverse operating conditions. It resists the corrosive effects of the weather. It has been the standby of experienced operators the world over for more than 30 years.

Texaco Crater is also an extremely effective lubricant for open gears. It cushions heavy loads and shocks, quiets noise, materially reduces wear.

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT STARRING JAMES MELTON WITH HIS GUEST, ED WYNN — CBS

ROADS AND STREETS

MAY, 1946 • VOL. 89 • No. 5

Million-Dollar Iowa Grading Job

Western Contracting Corporation using novel labor-saving snatch bar as part of big-name outfit on U. S. 67 project near Dubuque. State's new rolling specifications being watched with interest

By H. J. McKeever
Editor, ROADS AND STREETS

IOWA road contractors this year are cooperating on a new embankment specification. Whereas heretofore only smooth rollers have been required, the new specification requires not less than six passes with a tamping roller of specified weight minimum. Of particular interest is the clause on current work which requires that in the event satisfactory compaction is not obtained by twelve roller passes, the engineer may require some kind of drying or wetting procedure. In the event such procedure is required the contractor is allowed extra compensation.

The new specification is published in full following this article, which describes one of the largest road projects to get going this past spring in Iowa. This is the 15-mi. straightening, widening and paving job on U.S. 67 and 52 (joint route) from near Dubuque to Bellevue, Iowa.

The earth excavation totals 454,000 cu. yd. in connection with intermittent grade and curve reduction and widening of the existing graveled roadbed. The contractors put four 3-ft. diam. double-drum sheepsfoot units on the project as they opened up on the west end. All available heavy tractors were needed for scraper or dozer service, and during this past spring it was necessary to do rolling with farm tractors. At first the entire rolling load was carried by a single farm tractor drawing a single drum. A dual-drum unit was cut apart for this purpose, and the drawbar hitched to the drum by welding angle bars on either side, as shown in one of the accompanying photos. Meanwhile it is said that Western, which has a 7 million yard earth dam in Kansas and other projects, was scouting the nation for more tractors (and who isn't!).

Special Snatch Bar Saves Money

Western has the usual combination of tractor-scraper units and self-powered scrapers for the earthwork (see accompanying list). Operation of self-propelled scrapers is being speeded up by snatch loading, which is not new, of course. Rather novel, though, is the use of a special snatch bar designed and built by the contractor's forces. Again referring to photos, note the details. Taking the place of a cable—which requires a man on the grade to hook it on for each load—this bar can be lowered or raised, and also positioned laterally, by means of rope control from the tractor operator's seat. The lifting and lowering cable operates directly from the power take-off drum.

One worker is thus freed to work elsewhere, and the hook-up effected at least as quickly as by hand if not quicker. The arm is so designed that it can also articulate from side to side, enabling the tractor to turn while pulling.

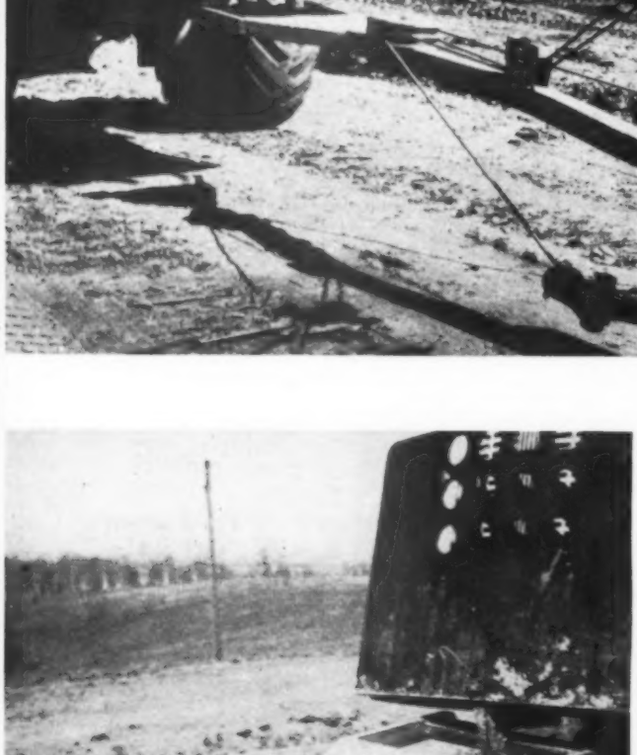
Widening Stone Cuts

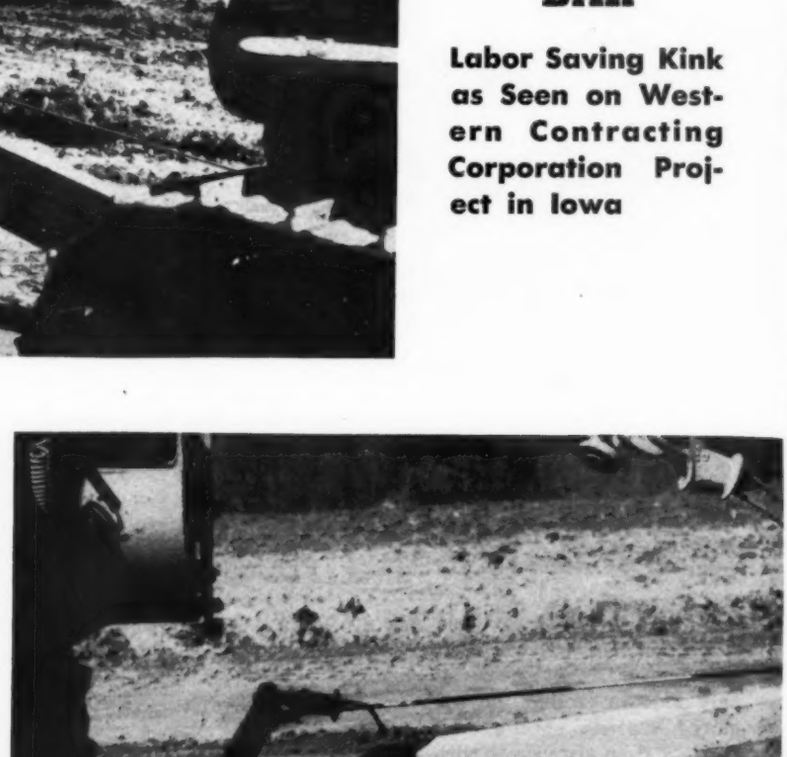
The project includes 200,000 cu. yd. of limestone excavation in widening of cuts and shelf locations. Cuts as high as 40 ft. are being handled, and

★ Big, fast rock jobs take a 2½-yd. shovel these days, thinks Western Contracting Corp.

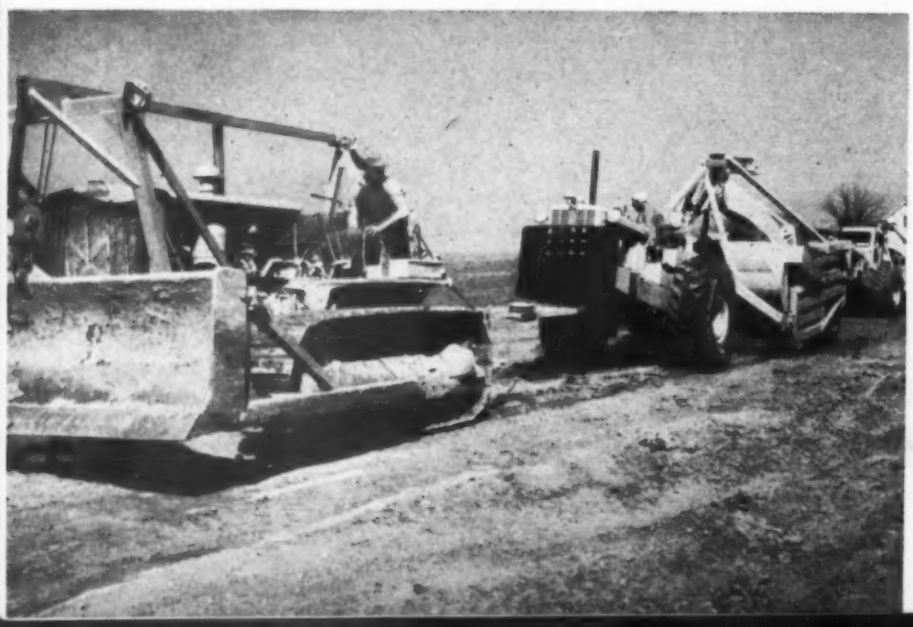
SNATCH BAR

Labor Saving Kink as Seen on Western Contracting Corporation Project in Iowa





★ Scraper snatch loading operations were speeded up, and the need eliminated for a man on the grade, by this shop-built snatch bar. Snapped by the R&S editor on Western Contracting Corporation's US 67 project in Iowa, this bar is raised by means of a cable from the power take-off drum, until it engages the hook. The bar is hinged at the tractor, the hinge pin being shown in lower right scene



★ Shots were touched off from a light plant generator. The boys here are checking current voltage and fastening the switch. The wire for the blast was anchored to the rock in the foreground until the generator was drawn up

work is strung along two or more large cuts at a time by variously deploying three 500-cu. ft. and one 250-cu. ft. compressors (all diesel), 6 wagon drills and several jack hammers. A 2½-yd. rock shovel is loading 10 yd. rear-dump Euclid rock trucks. Rock operations during April were carried on double shifts to keep pace with single-shift scraper work.

Culvert Contractor Lucky—Has Lumber

L. Peterson of Cedar Rapids has the contract for 80 or so concrete box culvert replacements and extensions on this job. Here is another veteran of the Alaska Highway, back in his home territory. Peterson has the usual portable 2-bag mixer, vibrator and crew, and he does heavier trenching with a 1½-yd. dragline.

But what makes him the envy of contractors hereabouts is the fact that he has plenty of form lumber (and nails). He was able to pick up 4000 bd. ft. of new one-inch sheathing and 2500 ft. of dimension lumber and will piece out with used lumber on hand. A small gasoline-engine powered table saw is set off the truck for each culvert job, thus sparing carpenters for other work.

Forms are reused where they'll fit. Otherwise, they're taken apart and carefully cleaned and de-nailed because, as Peterson says, "If these boards go, we're probably through."

A. Olson Construction Co. has the larger structures, consisting of a 120-ft. and a 150-ft. I-beam span and 12 x 12 culvert.

F. B. Thillen is resident engineer on the foregoing project under the Cedar Rapids district of the state highway department. Western Contracting Corporation's superintendent is Leonard C. Shelman.

Iowa's New Embankment Specification

Principal change from the old specification is the requirement of sheepsfoot in place of smooth roller. Six passes required as a minimum, with either discing (or harrowing) or moisture addition "when directed." Extra payment when more than twelve passes required by the engineer.

1. Description

This work shall consist of the preparation of the site and the placement and compaction of excavated materials to the required elevation and cross section as shown on the plans and in accordance with the following requirements.

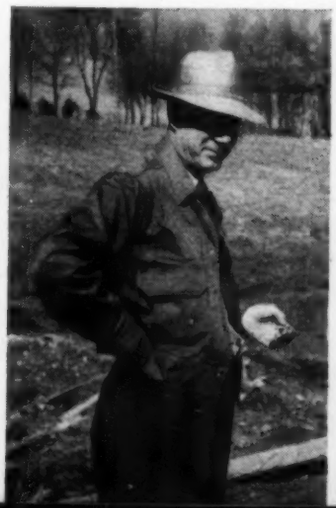
2. Roller

The roller used for the compaction of embankments shall be of the tamping type. It shall consist of one or more cylindrical sections each not more than 4 ft. in length and having studs or feet projecting not less than 6½ in. from the surface of the drum. The number of tamping feet and the area of the feet shall be such that the pressure on a single row of feet approximately parallel to the axis of the drum is not less than 200 lb. per square inch when supporting the full weight of the roller.

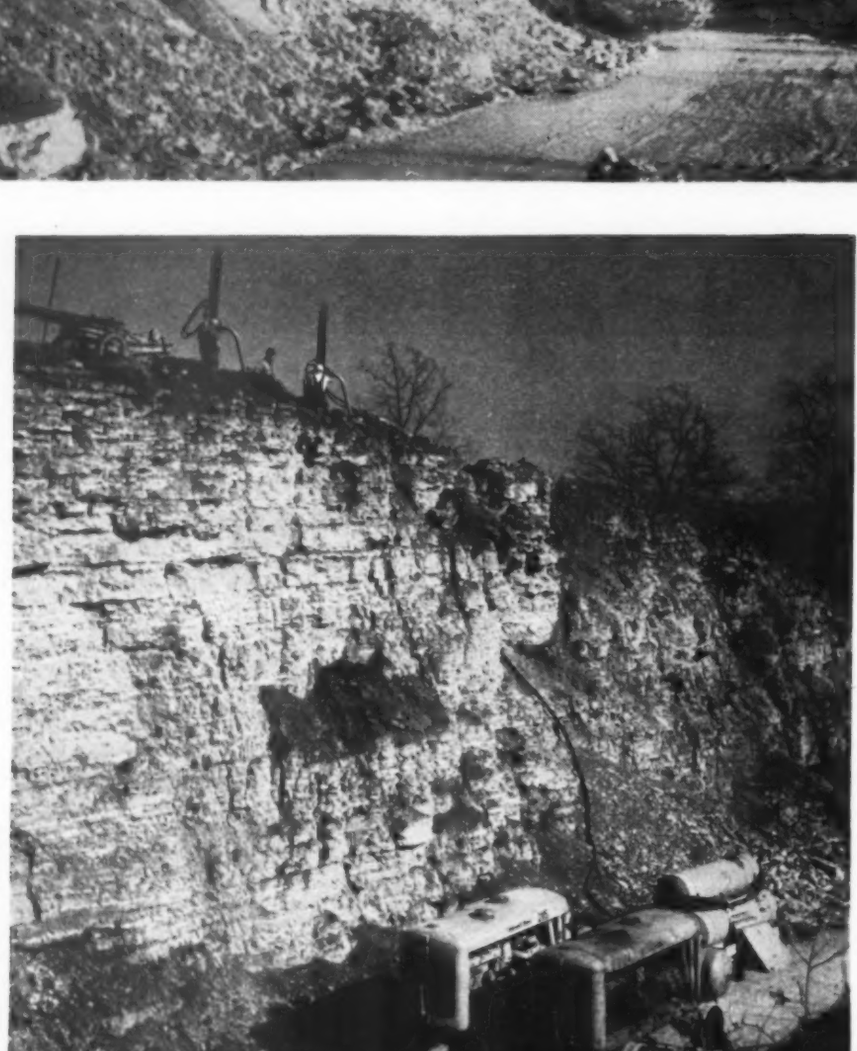
3. Preparation of the Site

Where the height of fill at the cen-

★ Eighty box culverts are being replaced or lengthened on this 15-mile reconstruction. L. Peterson, of Cedar Rapids, culvert contractor (pictured), is speeding his job with a new mobile 2-sack mixer and a small gasoline-powered table saw which can be trucked easily from spot to spot. Note example of lengthening of old culvert; stiff concrete mix about to be troweled for roof slab on steeply inclined grade



★ Here went a 2550-lb. shot. Nearly 200,000 cu. yd. of rock excavation is required on the 15 miles



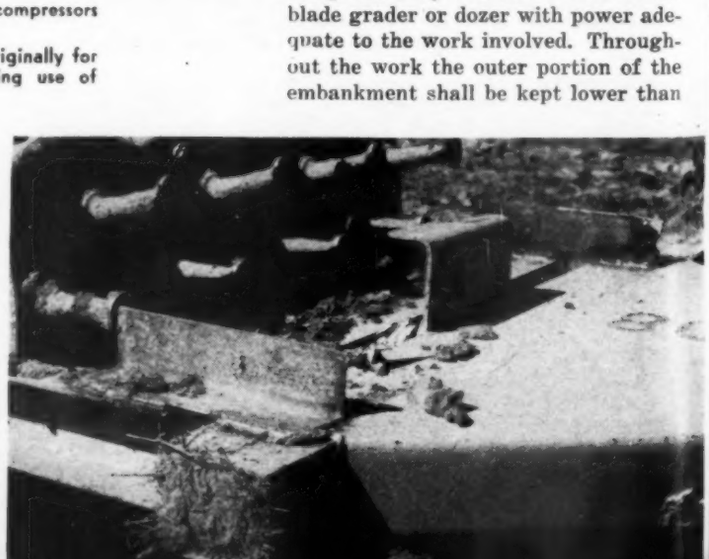
★ Lots of modern equipment on Western's job—two 500 c. f. compressors on a 40-ft. cut

★ Sheepsfoot rolling on Western's job. How drawbar designed originally for a pair of roller drums was welded to a single drum, permitting use of farm tractor

terline is 5 ft. or less, all sod shall be removed from the area and disposed of as shown on the plans or directed by the Engineer. Wherever a compacted road surface containing granular material lies within the 3 ft. next below the elevation of the subgrade of a proposed pavement or base course, such old road surface shall be scarified to a depth of at least 6 in. This scarified material shall be recompacted in combination with other earth in such a way as to avoid the formation of a layer materially less pervious to moisture than the remainder of the embankment. Wherever an embankment is to be placed on or against a slope steeper than 4 to 1 the slope shall be cut into steps as the construction of the new embankment progresses. Such steps shall each have a horizontal dimension not less than one foot and a vertical rise.

4. Construction of Embankment

A. Except in the case of rock fills, all embankments shall be carried up in horizontal layers not exceeding 6 in. loose thickness. Each layer shall extend the full width of the embankment and shall be smoothed before compaction by means of a suitable blade grader or dozer with power adequate to the work involved. Throughout the work the outer portion of the embankment shall be kept lower than



the center. The paths of the hauling equipment shall be distributed over the width of the embankment.

After being smoothed and before the next layer is deposited, the entire area of each layer shall be compacted by rolling with a sheepsfoot roller until the full weight of the roller is supported by the tamping feet but with not less than 6 passes. Should the soil be so wet that it will fail to be sufficiently compacted by 12 passes of the roller the Engineer may require that the soil shall be dried before or during the rolling operations to the extent required to produce the desired result. Such drying shall be accomplished by means of discs, harrows or other equipment having a similar effect. Such drying operations shall be paid for as extra work in accordance with the provisions of Paragraph 1109.05. Should the soil be so dry that it will fail to be sufficiently compacted by rolling, the Engineer may require the Contractor to moisten the material before compaction. Water may be added to the material either in excavation or on the embankment. The material shall be manipulated to secure proper distribution of the moisture before compaction. Any moistening of materials used in embankment construction, that may be required, will be paid for as extra work unless otherwise provided in the contract.

Wherever the operations in the construction of any section of an embankment are to be suspended, the surface shall be smoothed by means of a blade grader or dozer. The resulting surface shall be sufficiently smooth and compact that it will readily shed water.

B. When so specified in the Special Provisions, embankments may be required to be compacted to a measured degree of density and at a definite moisture content. In such cases the degree of density required will be stated as a percentage of "maximum density" and the required moisture content will be stated as a percentage of "optimum moisture." Each layer will be considered to have been compacted when that portion from 2 to 7 in. below the upper surface is compacted to the specified degree of density.

Bid Items on Foregoing Iowa Highway Job

PROJECT: 15.008 miles partial relocation and raising of standard from gravel to modern concrete paved arterial. Includes curve and grade reduction, seventy-nine new or lengthened culverts; three small bridges, widening of roadway throughout; 20 ft., 10-8-8-10 in. concrete pavement.

Separate culvert and bridge contracts for $63,272 and $63,673, respectively, details not shown. Total combined awards $1,089,503.

LOCATION: US 52 and 67, near Dubuque to Bellevue, Iowa.

DATE OF LETTING: October 30, 1945.

Grading Items

(1) Western Construction Corp., Sioux City, Iowa.
(2) Peter Kiewit Sons Co., Omaha, Nebr.
(3) McCarthy Improvement Co., Davenport, Iowa.
(4) Shirley Construction Co., Omaha, Nebr.
(5) E. M. Duesenberg, Inc., Clear Lake, Iowa.
(6) S. J. Groves & Sons Co., Minneapolis, Minn.
(7) Lowe Construction Co., Marion, Iowa.

Paving Items

(1) Western Construction Corp., Sioux City, Iowa.
(2) Hallett Construction Company, Crosby, Minn.
(3) Koss Construction Co., Des Moines, Iowa.
(4) Central Engineering Co., Davenport, Iowa.
(5) Harrison Engineering and Construction Co., Kansas City, Mo.
(6) C. F. Lytle Co., Sioux City, Iowa.
(7) Peter Kiewit Sons Company, Omaha, Nebr.
(8) S. J. Groves & Sons Co., Minneapolis, Minn.
(9) McCarthy Improvement Co., Davenport, Iowa.

Items	Quantity	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Stone masonry wall	297 cu. yd.	$17.35	$15.00	$27.00	$ 5.00	$ 5.00	$30.00	$16.00
Class I excav. roadway	199,125 cu. yd.	1.08	1.02	.90	1.20	1.60	1.67	1.65
Class II excavation, roadway and borrow	453,674 cu. yd.	.23	.34	.35	.25	.35	.345	.39
Class II excav. channel	4,124 cu. yd.	.36	.34	.50	.35	.35	.45	.60
Selected backfill material	10,180 cu. yd.	.42	.54	.50	.50	.50	.54	.60
Special backfill material	1,271 cu. yd.	3.50	3.50	3.00	3.00	3.00	.50	2.00
Overhaul	258,164 sta. yd.	.01	.01	.01	.01	.01	.01	.01
Removal and disposal of present curb	955 ft.	.39	.45	.50	.75	1.00	.50	.10
18" reinf. conc. roadway culvert	110 ft.	2.90	2.30	3.70	2.00	1.75	3.50	2.50
24" reinf. conc. roadway culvert	1,048 ft.	4.25	3.45	4.70	3.50	2.75	4.50	3.50
30" reinf. conc. roadway culvert	486 ft.	6.40	4.85	6.00	5.50	3.75	6.00	4.50
18" corr. metal entr. culv.	914 ft.	2.85	2.20	3.20	1.75	1.50	2.75	1.60
24" corr. metal entr. culv.	656 ft.	4.20	3.40	4.05	3.00	3.00	4.00	2.00
30" corr. metal entr. culv.	260 ft.	5.80	4.25	4.75	3.50	4.00	5.00	3.00
36" corr. metal entr. culv.	110 ft.	8.75	6.50	6.65	5.50	5.00	6.50	4.00
6" stand. tile drain	60 ft.	.87	1.85	1.00	3.00	.40	.70	.90
15" 2000D storm sewer	140 ft.	2.50	2.70	3.90	4.00	3.00	2.75	3.00
18" 2000D storm sewer	68 ft.	2.90	3.30	4.20	5.00	4.00	3.75	3.50
24" storm sewer	360 ft.	3.78	4.25	5.10	5.50	5.00	5.25	6.00
Stand. intake to tile drain	1	79.50	75.00	75.00	200.00	20.00	50.00	50.00
Umbrella top intakes	2	148.00	75.00	100.00	200.00	30.00	100.00	175.00
Driveway surf. material	2,130 cu. yd.	3.70	3.10	3.50	3.00	3.00	3.50	2.75
Flume posts	167	2.80	5.00	2.00	5.00	1.50	2.00	2.50
Finish earth shoulders	80,068 sq. yd.	.13	.20	.20	.15	.20	.10	.15
Manhole	1	154.50	100.00	150.00	250.00	100.00	180.00	200.00
Seeding	181	133.00	30.00	60.00	25.00	25.00	20.00	35.00
Sodding	5,806 sq. yd.	5.40	2.85	5.50	6.00	5.00	5.00	5.00
Mulching	90 sq. yd.	100.00	75.00	130.00	125.00	125.00	100.00	175.00
TOTAL Items		$434,465.18	$439,195.41	$450,069.34	$451,560.99	$571,398.54	$576,582.22	$602,762.45

Items	Quantity	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Stand. conc. pavement	1,781,488	$ 2.75	$ 2.78	$ 2.89	$ 2.83	$ 2.83	$ 2.92	$ 3.05	$ 3.27	$ 3.56
3" sloping curb	80,531	.12	.14	.10	.14	.10	.15	.15	.10	.15
Type A flumes	155	98.00	125.00	80.00	122.00	125.00	90.00	110.00	125.00	100.00
Type B flumes	12	110.00	125.00	80.00	122.00	100.00	90.00	110.00	100.00	125.00
Concrete slope drain	559	2.40	4.00	3.00	2.75	3.00	3.00	5.10	7.50	5.00
Metal Slope drain	2,801	3.35	2.75	2.00	2.45	2.50	3.50	3.30	3.50	5.00
Type 3 vertical well	23	20.00	5.25	10.00	20.00	20.00	10.00	15.00	20.00	10.00
Type A paving intakes	5	165.00	70.00	60.00	124.00	900.00	50.00	45.00	250.00	125.00
TOTAL		$528,092.87	$537,812.50	$544,072.13	$545,289.14	$546,428.70	$559,264.64	$586,467.69	$626,880.67	$680,944.37

If awarded grading paving deduct .08 per sq. yd. from paving price.

★ (Top): Cutting backslopes, in process of widening old roadway; heavy equipment pays here. Other scenes show a 250 c. f. compressor on jackhammer work and Western's big rooter helping the scrapers

placed in one layer using rock spalls and finer fragments which may be satisfactorily consolidated by the dozer and tractor. The last foot below the finished grade line shall be composed of suitable earth smoothed and placed in layers not exceeding 6 in. in loose thickness and rolled as hereinbefore specified. The Contractor shall conduct operations so the Engineer can take any cross sections required before the earth covering.

6. Rebuilding Embankments

A rigid pavement shall not be placed on an old and partly on a newly constructed embankment. If the width or position of the existing roadbed is such as to cause it to create the condition described above, the part of the old embankment which would otherwise be beneath the pavement shall be removed to the natural ground line or to a depth of 5 ft. below the proposed finished grade line, whichever is the less, and rebuilt as prescribed for new embankments.

7. Disposal of Unstable Soils

Unstable soils shall not be used in embankments except with the specific permission of the Engineer. The use of such soil shall be avoided in that portion of the embankment bounded by the plane of the finished grade, a plane 5 ft. below that plane and the planes making 1 to 1 slopes outward from the proposed shoulder lines. When used in embankments the unstable material shall be spread in uniform layers of not more than 8 in. and each layer covered with stable material.

★ Boulders dozed or blasted over the new embankment were caught in the toe trench shown at the left thus preventing big ones from rolling on into the creek bed, clogging the channel and being lost as fill material

5. Rock Fills

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the thickness prescribed above, without crushing, pulverizing or further breaking down the pieces resulting from the excavation methods, such material may be placed in the embankment in horizontal layers not exceeding 4 ft. in thickness. Each layer shall be leveled and smoothed with suitable dozer and by distribution of spalls and finer fragments or earth over the surface.

The 4-ft. lifts shall not be constructed above an elevation 2 ft. below the finished grade line. The next foot of height of embankment may be

Highway Departments Agree On New Truck Limits

18,000-lb. axle limit restored, new multi-axle formula adopted, 35 and 50 ft. length limits included in new regulations urged for state adoption

UNIFORM standards governing the maximum dimensions, weights and speeds of motor vehicles, proposed by the Highway Transport Committee of the American Association of State Highway Officials, have been adopted by a letter ballot of the member State highway departments, with a recommendation that they be incorporated in the motor vehicle laws of all states.

The Association recommends that the standards be considered for adoption by all states in order to promote efficiency in the interstate operation of motor vehicles, increase the safety of highway transportation, and establish a basis for regulation of the many relationships between the dimensions and weights of motor vehicles and the strengths and capacities of existing highways.

The standards, based upon years of research by highway departments and the PRA, are advocated in lieu of recommendations previously made by the AASHO November 17, 1932, and of modified emergency recommendations adopted May 27, 1942.

They were submitted to representatives of the American Automobile Association, the Automobile Manufacturers Association, the National Council of Private Motor Truck Owners, Inc., the National Association of Motor Bus Operators, the American Trucking Associations, Inc., and the Truck Trailer Manufacturers Association for review and counter-proposals before they were presented to the state highway departments for approval.

The recommendations, as finally adopted, are as follows:

96-in. Width

1. Width—No vehicle, unladen or with load, shall have a total outside width in excess of 96 in. (Note: It is recognized that certain conditions inherent in the design of vehicles suggest the desirability of 102 in. as a standard of maximum width, but the existence of numerous bridges and a large mileage of highways too narrow for the safe accommodation of vehicles of such width precludes the present adoption of the higher standard of width. The state highway departments and the PRA are urged to give serious consideration to the desirability of eventual provisions for the accommodation of vehicles 102 in. in width in planning the reconstruction of Federal aid and State highways.)

2. Height—No vehicle, unladen or with load, shall exceed a height of 12′ 6″.

3. Length—(a) No single truck, unladen or with load, shall have an overall length, inclusive of front and rear bumpers, in excess of 35 ft.

(b) No single bus, unladen or with load, shall have an overall length, inclusive of front and rear bumpers, in excess of 40 ft., provided that a bus in excess of 35 ft. in overall length shall have not less than 3 axles.

(c) No combination of truck-tractor and semi-trailer, unladen or with load, shall have an overall length, inclusive of front and rear bumpers, in excess of 50 ft.

(d) No other combination of vehicles shall consist of more than two units, and no such combination of vehicles, unladen or with load, shall have an overall length, inclusive of front and rear bumpers, in excess of 60 ft.

Speed Regulations

4. Speed—(a) Minimum speed. No motor vehicle shall be unnecessarily driven at such slow speed as to impede or block the normal and reasonable movement of traffic. Exception to this requirement shall be recognized when reduced speed is necessary for safe operation or when a vehicle or combination of vehicles is necessary or in compliance with law or police direction proceeding at reduced speed.

(b) Maximum speed. No truck shall be operated at a speed greater than 45 mph. Passenger vehicles may be operated at such speeds as shall be consistent at all times with safety and the proper use of roads.

(c) Vehicles equipped with solid rubber or cushion tires shall be operated at a speed not in excess of 10 mph.

5. Permissible loads—(a) No axle shall carry a load in excess of 18,000 lb. (Note: An axle load shall be defined as the total load transmitted to the road by all wheels whose centers may be included between two parallel transverse vertical planes 40 in. apart, extending across the full width of the vehicle.)

(b) No group of axles shall carry a load in pounds in excess of the value given in the accompanying table corresponding to the distance in feet between the extreme axles of the group, measured longitudinally to the nearest foot.

Distance (ft.) between extremes of any group of axles	Maximum load (lb.) carried on any group of axles
4	32,000
5	32,000
6	32,000
7	32,000
8	32,610
9	33,580
10	34,550
11	35,510
12	36,470
13	37,420
14	38,360
15	39,300
16	40,230
17	41,160
18	42,080
19	42,990
20	43,900
21	44,800
22	45,700
23	46,590
24	47,470
25	48,350
26	49,220
27	50,090
28	50,950
29	51,800
30	52,650
31	53,490
32	54,330
33	55,160
34	55,980
35	56,800
36	57,610
37	58,420
38	59,220
39	60,010
40	60,800
41	61,580
42	62,360
43	63,130
44	63,890
45	64,650
46	65,400
47	66,150
48	66,890
49	67,620
50	68,350
51	69,070
52	69,790
53	70,500
54	71,200
55	71,900
56	72,590
57	73,280

(c) The maximum axle and axle-group loads recommended above are subject to reasonable reduction in the discretion of the appropriate highway authorities during periods when road subgrades have been weakened by water saturation or other cause.

(d) The operation of vehicles or combinations of vehicles having dimensions or weights in excess of the maximum limits herein recommended shall be permitted only if authorized by special certificate issued by an appropriate state authority.

EDITORIAL

★ President's Safety Conference

Congratulations to all who share the credit for the President's Highway Safety Conference—to major general Philip B. Fleming and colonel Light B. Yost for able executive direction; to Thomas H. MacDonald and his coordinating committee members for soundly planning the details of the affair; to the chairmen, secretaries and hundreds of working members of the various committees for thinking their jobs through, and to Paul Hoffman for underscoring the word "action."

Yes, and praise to our President himself for his pithy, down-to-earth extemporaneous talk before the conference. He rang the bell in challenging state and federal law makers to have the courage to legislate unfit drivers off the highways. Until that is done, all efforts of the "Three E's" are partly nullified in advance.

The Conference succeeded brilliantly in its immediate purpose of creating thousands of headlines on the grave matter of traffic accidents.

Another immediate result was a clear, comprehensive statement of the problem and of action needed on seven major phases of the safety problem. Preliminary committee reports were printed in advance of the meeting on each of the subjects: Accident records, education, enforcement, engineering, laws and ordinances, motor vehicle administration, public information, and organized public support. The amended reports, characterized as of epochal importance, were praised by Mr. Hoffman as representing a master-plan statement of principles, "open covenants openly arrived at" under democratic procedures.

ROADS AND STREETS naturally is concerned mainly with the engineering of safety into streets and highways, and elsewhere in this issue we present excerpts from the preliminary report of the conference committee on engineering. This editor attended the engineering sessions and to our mind the most noteworthy statement made in discussion was that of commissioner Cox of Connecticut. He put his finger on the human failing of us all in walking out of such meetings full of fine resolves only to lapse into a busy routine and forget. That has applied particularly to safety matters. Mr. Cox announced that he intended to place copies of the engineering recommendations immediately in the hands of his department heads and follow within a week with a conference to coordinate safety considerations with all phases of highway department work. Such a spirit is perhaps one of the reasons Connecticut's traffic accident rate is far below the national average.

The next step is for forty-eight states to hold traffic safety conferences. These, as was pointed out, will be useless gestures unless the state is fortunate enough to have a safety-crusading governor and a workable official set-up. Even then months of thorough committee work such as marked the President's conference must come first.

Again quoting Mr. Hoffman, a goal cutting the accident rate in half is a practical p o s s i b i l i t y within three years. The opportunity to tie in with such an effort transcends all other considerations in highway and street engineering.

★ We In Aviation

With the passage by congress of the national airport bill the basis has been provided not only for a national system of airports, but also for many a jurisdictional dispute. Such a dispute between the advocates of channelling funds for airports through the cities and the advocates of channelling the funds through the states delayed passage of the legislation sufficiently so that almost one whole year has been lost. As it happens, the state people lost. Any public agency, or two or more acting jointly, may submit a project application.

Except as it names the Civil Aeronautics Administration as the agency to administer the program and sets up procedures, the bill will have no meaning until funds are appropriated for its enactment. First the congress will have to appropriate federal funds for planning and construction and then the various states will have to get their enabling legislation in line with federal requirements. The public agencies submitting project applications have a lot of spade work to do getting their funds and legislation in order. Congress also has to consider and pass approval on each and every class IV or larger airport which the Administrator of CAA sees fit to send along to it as having merit. It is easy to see that many people and many agencies are involved, and by no means all of them aviation-minded or inclined to be cooperative.

CAA's experience in literally giving away millions of dollars for airports, wherein the sponsor was required only to provide the property, showed that financial participation to even this limited extent required super-salesmanship. As an example, one of the leading cities in Virginia refused an airport estimated to cost over one million dollars for the sole reason that it required the outlay of about $30,000 for property. It is estimated that the sponsoring public agency will have to put up about one-third of the cost of the project under the terms of the bill just passed. Airports are going to be in competition with many much-needed civic improvements for both funds and property. Real estate development interests can be expected to actively oppose the preempting, by an airport, of a desirable site for either homes or industries. Federal legislation, requiring financial participation by other governmental agencies, does not assure a national system of airports by any means. It was probably the lowest hurdle of them all.

The above assessment of the airport picture is not intended to be critical of legislation or unduly pessimistic. It is time for the romantic aspect of aviation to take its proper

place in the scheme of things and that calls for a factual survey of its basic facility, the airport. It seems logical that aviation will very soon have to get on a pay-as-you-go basis; at least to the same extent as other forms of transportation do. It will take the best brains, and all of them that are available, working together to properly equip this nation with airport facilities.

Not too long ago the American Road Builders' Association created its airport division and staffed it with the best men available. The list of names of its officers and directors reads as though it were taken from a book on who's who in aviation. The ARBA has devoted a goodly percentage of time in its technical sessions to the discussion of airport problems. By the dissemination of factual information, it was influential in breaking the deadlock which held up the airport bill so long. While the name "Road Builders" might logically imply that this association's first love concerns roads, there certainly is nothing in its actions to date that indicate it intends to assign anything akin to a step-child role to airports. There is no reason to believe that it ever will have occasion to discriminate against airports in favor of roads. Its members have built and no doubt will continue to build most of the airports. When these contractors have completed their work members of other associations take over to construct buildings, communication facilities, and to operate public services. Airport construction and road building are so very similar in every respect that it is beyond any stretch of the imagination to conjure up a need for an "Association of Airport Builders." Except for personal preference, the membership would be largely interchangeable.

Fortunately the ARBA enters the airport picture in the very early stages and at the time when the very costly and sometimes irreparable mistakes are likely to be made. The word "fortunately" is used because of the enviable record ARBA has in promoting the highest possible standards of planning, design and workmanship. ARBA also enjoys a high standing and close association with many agencies, other than CAA, who will play an increasingly important part in the planning, design and inspection of airport work. Consulting, state-highway, county and city engineers will make the detailed local surveys and prepare plans. ARBA has worked with all of these men before and is now in a position to offer them additional service and guidance. In instances where highways or city streets have interests conflicting with the airport plan, ARBA is the only group offering common ground for arbitration.

High government officials have, on more than one occasion, stated publicly that Congress depends on ARBA for factual highway information. ROADS AND STREETS has no doubt but that ARBA will provide the nation with a similar service in carrying out the national airport plan.

W. R. Macatee, manager, ARBA Airport Division, is to be commended on the clear-cut manner in which he has stated the Association's purpose and aims. Whether or not you agree entirely, at least you know definitely what they think and advocate. It is gratifying to learn that Congressman Randolph of West Virginia and Assistant Secretary of Commerce Burden have expressed their confidence and pleasure in ARBA's forward-looking step.

The editors of ROADS AND STREETS feel that WE IN AVIATION is a term which ARBA, and all the contractors and engineers for whom they stand, can rightfully use, and further that WE IN AVIATION cannot afford to look askance at the service ARBA is so competent to render.

★ Niggardly Street Budgets

"We can't get enough money for streets."

This plaintive note is heard from municipal engineering chiefs in city after city as we go visiting around the country. In St. Paul, Minnesota, for example, PW commissioner Milt Rosen and city engineer George Shepard say they've asked the city budget makers for $500,000 a year for street repairs and reconstruction. They got $150,000. With inflation here, this city's war-torn streets need $800,000, in addition to state and federal aid for arterial projects and property owner and on petition-assessment work.

What's the answer? Easy: salesmanship. That is, fundamentally. In St. Paul and certain other cities the job would take an earthquake, or at least a long time.

Not so easy is the actual job of selling a community and its councilmen and budget making officials. It can't be done overnight; in fact, is most successfully accomplished when done day after day through the years. Expressways that will plow boldly through blighted areas are dramatic subjects, yet metropolitan cities were a quarter of a century selling them. Ordinary street fixin' jobs—repaving or resurfacing, widening here and there, etc.—are not individually dramatic, yet collectively, as a program to uplift a whole city, they can be made extremely so—in terms of traffic deaths eliminated, stepped-up business efficiency, time saved, beautification. Yes, and in fiscal economy.

The real trouble often is that engineers don't consider public campaigning part of their jobs. But it is—perhaps the most important part! Cities need engineering leaders who are skilled public speakers, with a knack of translating slide rule data into human values and an enthusiasm that builds fires under newspaper editors and other civic leaders.

Of course each city's problem is different. St. Paul has a legal limit of thirty dollars per capita on annual operating budgets, which must cover fire, schools and everything. Raising that limit will be a difficult matter. But such limits must be adjusted in this inflationary period if cities are to keep pace with the motor age.

★ Engineer's Estimates and 1940 Prices

In our opinion, engineers' estimates, while useful for a number of purposes, do not have too much to recommend them as a basis for throwing out bids in a rather wholesale fashion. The engineer's estimate is a venerable institution and has been found to be a convenient basis on which to refrain from awarding a job to an undesirable contractor or to provide a smoke screen in instances where outside pressure, an error or a shortage of funds made it expedient to readvertise. Its main claim to continued existence is the fact that legislative bodies must have some basis on which to prepare budgets, appropriate funds and propose bond issues.

(*Continued on page* 79)

High Production with Low Accident Rate

Wilkes-Barre—Scranton Airport

Mine gallery filling was an unusual problem on 4,000,000 cu. yd. grading job. Contractors fought tough conditions and high liquidated damage rate with ingenuity and organization efficiency

By H. K. Glidden
Eastern Editor, ROADS AND STREETS

THE Pennsylvania cities of Wilkes-Barre and Scranton, located in the Lackawanna River valley, are the centers of a population of about 1,000,000 people. This highly industrialized area, rich in coal deposits, has lacked air transportation facilities largely because of its mountainous nature and the uncertain subsurface conditions which active and abandoned mine workings have brought about. The combination of federal funds, cooperative local sponsorship, high class engineering, and contractor ingenuity are fast remedying this unfortunate situation.

Cooperation Exemplified

This project is a large scale demonstration of the remarkable accomplishment that can result from sincere cooperation between all of the parties concerned. Wilkes-Barre and Scranton, located in Luzerne and Lackawanna counties, respectively, did their part by getting together and providing a 350-acre site on a mountain top midway between the two cities and near the small town of Avoca. Avoca has done anything but put stumbling blocks in the way of these two cities or the contractors.

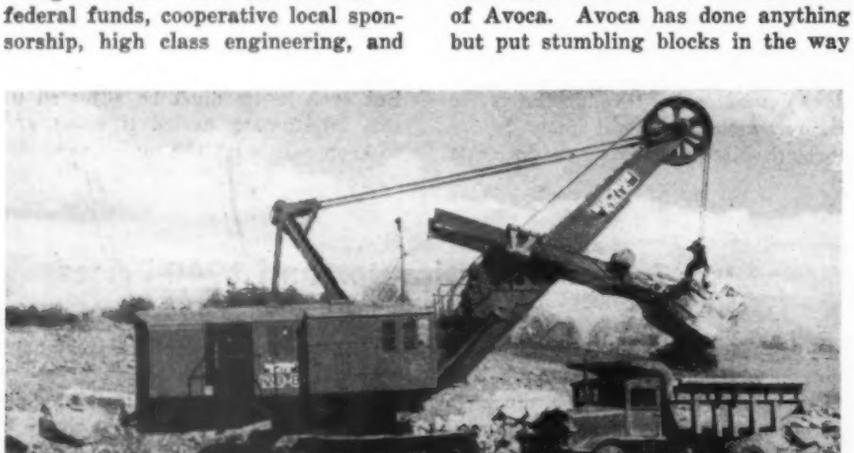
Engineer - contractor relationships have been excellent despite the tough problems presented by a rush job and completely unpredictable subsurface conditions. In spite of the best efforts on the part of CAA engineers in putting together the plans and specifications, the mine workings caved in and had to be excavated.

Labor has been plentiful and entirely reasonable in its demands. The weather entered into the spirit of the thing by staying mild enough to allow large scale operations all winter.

Brewster to Langenfelder

The George M. Brewster & Son Co., Inc., of Bogota, N. J., carried the ball during 4,000,000 cu. yd. of grading (about 60% rock) along with the attendant clearing, drainage and subbase work. It takes a great backfield to pile up all that yardage against nature's toughest line of resistance—unclassified rock excavation. And especially so when the liquidated damage penalty for too many times out is $3,500 per day for all over 300 calendar days. Raymond W. Moore, project manager for Brewster, is to be complimented on the teamwork he inspired.

When the job was visited in mid-April, J. P. McInnis, superintendent for C. J. Langenfelder & Son of Baltimore, was warming up a likely looking paving outfit to take over where



★ 5-yd. shovels—five of them—played a big part in moving 40,000 cu. yd. in peak day

Brewster leaves off. While the Brewster crew wisely relied on heavyweights in the way of equipment and lots of them, it looks like Langenfelder is relying on a quick opening offense based on skill and strategy. The sponsors and the CAA have profited greatly by the skill of each team.

Almost a Road Show

There aren't very many places other than the big Road Show where you can see 3½ million dollars' worth of construction equipment of almost every variety at one time. Brewster had this much at Avoca and nearly all of it working at once. It took about 200 men to operate the equipment shown on CAA records for a typical day. The result was a peak day of 40,000 cu. yd., and 24,000 to 30,000 was average. The equipment list for a day last November:

16 shovels, cranes
24 bulldozers
2 rollers
41 wagon drills
25 bottom dumps (15 cu. yd.)
1 boom tractor
1 self loading scraper
8 scrapers
17 compressors
1 rooter
13 trucks
5 graders
43 11 cu. yd. trucks

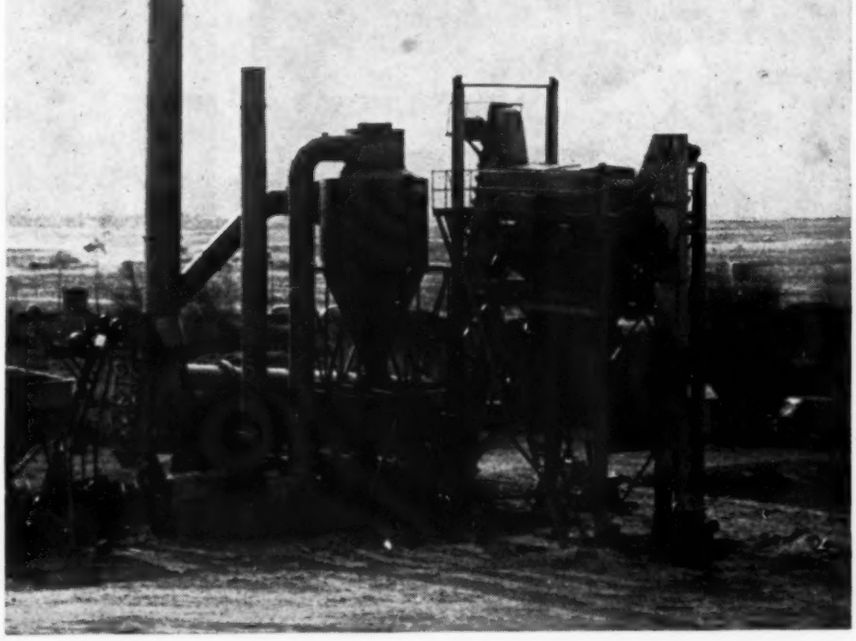
CAA used 15 engineers and inspectors under the supervision of James Harendeen, resident engineer, to keep stakes set and inspection performed.

Only One Major Accident

Knocking on wood, no one has been killed and the only major accident so far involved the feet of a worker who got in the path of a bulldozer. Eight or 10 minor accidents have occurred. Questioned on Brewster's accident prevention policy, W. W. Blauvelt, vice pres., said that the company employed no special safety personnel. He said that they cooperate with the safety engineers of their compensation insurance companies who visit their jobs regularly and make safety recommendations. Brewster supervisory personnel are instructed and expected to fully carry out such measures as the specialists prescribe. Based on the Avoca results, the plan appears completely adequate, particularly in view of the number of men and pieces of equipment involved.

Discussing the safety aspects of haul-road layout, Mr. Blauvelt explained that the location and routing of haul roads on their projects are the responsibility of the project manager. Assisted by Brewster's resident engineer, the project manager lays out the haul roads after a careful study of a contour map and actual

★ Log shelter protects compressors against flying rocks



★ (Above): The airport is down hill from this modern portable asphalt plant, being erected near the project

★ (Below): 3 separate stone bins and a dust bin are provided for various sizes of stone in this modern portable crushing plant

★ All Brewster equipment is periodically cleaned with live steam at 120 lb. pressure

★ (Below): Brewster's tire foreman says this hydraulic machine, for removing tires from rims works, without regard for tire size, rim rust or any of the other factors which make a tire stick

★ Whirlwinds, such as this one, occurred frequently near the lubrication building, making proper oiling and greasing even more important.

★ (Below): Very few garages have as much floor space as does Brewster's field maintenance shop

observation of site conditions. Economical haul, taking into account the type of equipment to be used, is the prime consideration. Mr. Blauvelt stated that all necessary safety measures, such as flagmen at sharp curves or blind intersections, are put into effect as soon as the haul roads start to be used. This company has found that keeping haul roads well drained and in smooth condition makes for both efficiency and safety. Grades on these roads are kept below 10%.

Service and Maintenance Stressed

The results of the Brewster policy of regularly scheduled maintenance and prompt repair of equipment are easily noticeable from the appearance of each machine as well as the infrequency of break-downs on the job. On this large project, a separate building is used for tire storage and repair, lubrication, and equipment maintenance. Each building is laid out for its specific purpose and is equipped with specialized machines.

All major repairs and maintenances are performed in one of these three buildings. Trucks equipped for service and minor repairs handle routine greasing, oiling, and normal break-downs out on the project.

Steam cleaning of equipment is standard practice with Brewster. For this purpose they have installed a 50-hp. boiler which furnishes steam at 120 lb. pressure. Using a set-up similar to a grease rack, each piece of equipment is thoroughly cleaned as its turn comes up. The dividends of this high-pressure scrubbing show up in lowered maintenance costs, early discovery of signs of failure or worn parts, and an efficient working outfit.

★ Special teeth on grader blade, for combing the over-size stones out of the subbase

Mine Packing a Problem

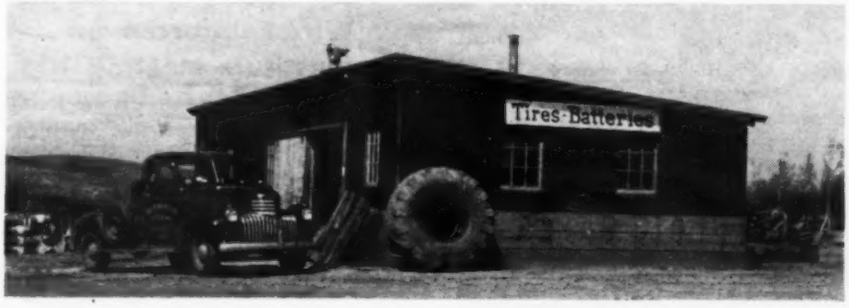
The most unusual problem on this project for the CAA engineers was the necessity of determining what action would constitute adequate protection against future cave-ins resulting from subsidence of abandoned coal mines which lie under an extensive area of the airport. The sponsor, of course, has a vital interest in this matter because of the terrific loss of life and property which could result from an airliner breaking through into a cave-in.

★ Deep quarry face enables shovel to load special dump trucks rapidly

Assisted by officials of the Pennsylvania Bureau of Mines, the conclusion was reached that 20 ft. of undisturbed material immediately below the subbase would be adequate to bridge any cavities below that depth. On this basis, exploratory borings staggered on 50 to 100 ft. centers 20 ft. deep have been made over the entire pavement area of the airport and 25 ft. on each side.

The exploratory borings resulted in the removal of material which involved cavities or gave evidence of likely future subsidence. The excavated areas were then filled with suitable earth and rock and thoroughly compacted. Such open mine shafts as were encountered were filled with earth and then capped with concrete.

At the request of the sponsors, some doubtful areas were bored to a depth of 30 ft. as a precautionary measure.



★ Tires and batteries rate a special building on this project

★ Brewster key men: Frank H. Lemke, office engineer, W. W. Blauvelt, vice pres., and Raymond W. Moore, project manager

Paving Started May 1

Langenfelder & Son started their $730,000 paving contract on May 1 even though Brewster's work will continue into July. CAA's contract with Brewster established a priority area, the early completion of which gives the paving contractor ample working space. The job involves 308,800 sq. yd. of flexible pavement having a 5-in. subbase, 9-in. dry-bound-macadam base, and 2-in. plant-mix surface.

Down Hill Pull

The world by the tail and a down hill pull is literally true insofar as pavement materials are concerned, as a result of Langenfelder's ingenuity. And it takes ingenuity to have a down hill (and steep) haul when you are paving a mountain-top airport. Locating a good quarry site on what is left of the mountain top, the paving contractor has made it feasible to set up a portable crusher and asphalt plant right on top of the job. The crusher and asphalt plant couldn't be any closer.

Imagine an equilateral triangle about 300 or 400 ft. on a side with the quarry at one corner, the crusher at another, and the asphalt plant at the other, and you have an approximate picture of the plant layout. With a penalty of $650 a day for time over 120 days, the contractor will need every possible advantage.

Good Stone Production

Beating the gun by about 40,000 tons crushed between March 19 and May 1, Langenfelder expects production to stay around 1,600 tons per shift using the portable crusher shown in the accompanying photographs. All the required sizes of stone for base and surface course are being produced and stock-piled in a location easily accessible to the asphalt plant. Trucks constructed specially for handling stone are expediting both quarry production and stock-piling.

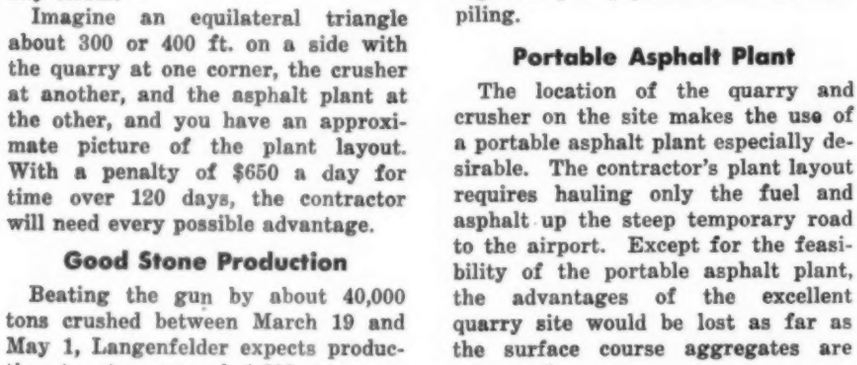
★ Dump trucks designed for quarry and crusher use do their share in maintaining production

Portable Asphalt Plant

The location of the quarry and crusher on the site makes the use of a portable asphalt plant especially desirable. The contractor's plant layout requires hauling only the fuel and asphalt up the steep temporary road to the airport. Except for the feasibility of the portable asphalt plant, the advantages of the excellent quarry site would be lost as far as the surface course aggregates are concerned.

Project Well Handled

After several false starts, including the issuance of a proposal and rejection of bids by the U. S. Engineers, the project was suddenly placed in the rush category and turned over to the New York office of CAA for completion. This agency, with Albert Wessel, Supt. of Airports, handling sponsor negotiations, and R. M. Brown, Chief Airways Engineering Branch, handling engineering and contract inspection, is to be complimented on the expeditious and thorough manner in which the airport is being completed.



★ V-belts transmit all the power required to operate Langenfelder's modern crushing plant

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Wire Reinforcement Institute Meeting

At a meeting of the Wire Reinforcement Institute at Hot Springs, Virginia, on April 24, a survey of the welded wire fabric industry revealed the fact that, despite the scarcity of steel, there will be an adequate supply of road mesh to take care of the highway program this year.

Mr. J. C. Shepherd, Executive Vice-President of the Sheffield Steel Corporation, was elected President of the Institute for the coming year to succeed Mr. Ford P. Schusler of the Keystone Steel & Wire Company, while Mr. W. H. Stewart, Sales Manager of the reinforcing products division of Truscon Steel Company, was elected Vice-President to succeed Mr. G. L. Crawford of the Wickwire Spencer Division of the Colorado Fuel & Iron Corp. Mr. T. J. Kauer, Managing Director of the Institute, was re-elected Secretary and Treasurer.

New by-laws were adopted by the Wire Reinforcement Institute and it was also decided to incorporate. The Institute was established in 1930.

(*Continued from page 73*)

As is true with everything the engineering profession does, estimates are strictly honest. By the same token estimates are influenced by the prevalent lack of sufficient help to give every phase of the project all the study it deserves. Most engineering offices have neither the time, money nor talent to bid the job on the same make-or-break basis which the contractor is required to do. The engineer is further handicapped by not being able to get the same down-to-earth quotations which the materials people must furnish the contractor. The essence of the situation shows up clearly where you compare the remuneration of the successful contractor and engineer. Being able to bid each job at the right price is, in the long run, the thing that makes or breaks the contractor. Conversely, the engineer can second-guess for nothing.

Nineteen forty prices are nice things to look back on. Our present salary would have stretched a long way then, but we put them in the same category with the engineer's estimate as a basis for throwing out a high percentage of bids. Hardly anything is the same as it was in those days when you could actually ask for a demonstration before you bought a car or a piece of equipment. Sounds silly now, doesn't it? As we remember it the distributors laid awake nights figuring out how to knock off a sale. Common labor still existed and it was pretty much all right if the contractor figured out who should do what and when. There wasn't any need to add a contingency percentage to cover OPA's whims. Another nice thing about that period was that a contractor was quite safe in spending a lot of time figuring a job as it was almost a foregone conclusion that it would be awarded to the lowest qualified bidder. The idea was prevalent then that producing things was a good way to keep the ball rolling.

Fifty per cent is a good figure and comes in for a lot of use in marking up merchandise and goes well when combined with "more or less." It and other similar percentages are so commonly used that no one much objects to them. At the expense of being repetitious, we are going to say that we do not like such figures when they have any connection with throwing out bids for the construction of our muchly-needed highways. We just are not the least bit convinced that when all such things as equipment shortage, labor shortage, labor unrest, the tax structure, and possible acceleration of the inflationary trend are all added together that it comes out fifty per cent above 1940 prices or that it will come out the same per cent from day to day or place to place.

Before we go on to finally tell what it is that we do not object to, just one more question. How does one figure out 1940 prices? We do not know, so we are sincere in asking the question. We heard recently about a state highway engineer who is trying to re-figure his 1940 prices. It seems he is quite concerned about whether PRA will accept the revised figures. There is a great deal of truth in the old saying that a set of figures can be made to prove almost anything the person manipulating them wants them to. Personal, local or agency quirks or desires should have no place in impeding our highway program, but they are bound to as long as the manipulation of figures enters into the picture.

The law of supply and demand, working unhampered in a system of free enterprise, has set the price of things throughout the entire history of the growth of this great nation. What is the matter with letting this law help us now as it has always done before? With due respect to the engineers, there is no doubt whatsoever in our mind that the only genuine estimate of what it will cost to do a specific job is the price for which the low bidder has indicated a willingness to enter into a contract. The high mortality rate in the construction industry proves that the low bid is quite often too low. Low bids, of course, can have no basis of fact unless true competition has been secured, with the bidders having reasonable assurance that the bidding will result in the award of a contract. Token bids do not count.

We cannot hold with that line of reasoning which calls for holding up the program until prices are down again. In the first place we do not think prices are coming down (see R&S March '46 "Future Construction Costs") and in the second place the economic loss resulting from transportation tie-ups and accidents on our outmoded and overcrowded highways makes the saving in construction costs sound like small potatoes.

We advocate making a prize package of each and every highway and city street project, making it the size that will attract the most contractors. Make use of escalator clauses where necessary to protect the contractor against damage from unforeseeable conditions. Keep the individual contracts small enough in size so that they can be completed in a short enough time so the contractor does not have to gamble on labor, material and equipment conditions a year or more away. And let it be known and understood that a contract is going to be awarded if good competitive bids are received. We have a great faith in America's contractors. They did a great job during war times so why not believe that the prices they give you in peace times are fair and honest, intended only to leave as little "on the table" as possible?

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Nail Picker Prevents Punctures — During the 1945 season the magnetic nail picker of the Minnesota State Highway Department removed 6,945 lbs. of metal from 2,480 miles of trunk highways. Cost of operation was 97c per mile of highway, or 34c per pound. Each pound contained an average of 100 pieces of metal that might cause punctures, plus some harmless material. The nail picker has an 8-ft. magnetic bar mounted at the rear of a truck. Charged by a small gas-electric generator, it is powerful enough to pick up nails covered by 1 in. of gravel. Four trips over a gravel highway are usually required to cover full width.

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Ohio $5,000,000 Non-Federal Aid Program—A $5,000,000 road construction program, separate from the post-war federal aid program, is expected to be placed under contract by the state highway department by July 1. The program includes 88 projects in 58 counties, and will be financed by gasoline tax funds.

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A highway bridge across the Mississippi River at Clinton, Iowa, is authorized by a bill signed by President Truman. It renews an expired authorization granted by a previous Congress.

Crediting Mr. Hinkle on Asphalt Erosion Control Article

The article in April "Roads and Streets" on "New Developments in Use of Asphalt for Erosion Control" should have borne the name of A. H. Hinkle, district engineer, Asphalt Institute, Cincinnati, as author. Reprints of this excellent article will be available on request to the Asphalt Institute, Chamber of Commerce Bldg., Cincinnati, Ohio, or 802 Second Ave., New York, N. Y.

Engineering's

Part in Eliminating the Highway Traffic Toll

Excerpts from the preliminary report of the Committee on Engineering of the President's Highway Safety Conference, held at Washington, May 8-10

THE final report of the Committee on Engineering of the President's Highway Safety Conference should be available by the time this is in print. The preliminary report, used as a basis for the conference discussion, along with reports of other committees, is in itself a notable document, representing a great deal of thought and effort in its preparation. Following are excerpts from this voluminous 48-page document. Gibb Gilchrist, president, Texas Agricultural and Mechanical College, was committee chairman; A. A. Potter, dean of engineering, Purdue University, vice-chairman; and Charles W. Prisk, highway engineer, Public Roads Administration, secretary. Some seventy highway and street engineering leaders made up the body of the committee.

The report covers (1) general aspects, including accident factors, responsibility of the engineer and other phases; (2) the highway itself; (3) the role of the vehicle and its operation, and (4) a recommended action. These excerpts are confined to (1) and (4) due to space limitations, and it is understood that probably important revisions will be embodied in the final report.

General Aspects

The rebound of traffic-accident rates to pre-war levels and the possibility that they may reach an all-time high during 1946 is a matter of serious concern to the engineering profession. For a considerable span of years, engineers have been striving to provide vehicles, roads, and operational control which will enable the private motorist, the commercial vehicle operator, the passenger in a public conveyance, and the pedestrian to reach their destinations conveniently and safely. In these efforts, two factors have demanded top consideration: (1) Human behavior, and (2) physical conditions. Highway, automotive, and operations engineering are alike in this respect. Close liaison among these three groups has paid and will continue to pay significant dividends in the form of lives saved, injuries avoided, and property damage prevented.

The problems of the future, though remarkably like those of the past, will be complicated by a far more intensive use of motor transport than has yet been seen. In the more populous metropolitan areas, it will be exceptionally difficult and costly to superimpose adequate and safe transportation arteries on the existing street pattern, yet it is likely that there can be no other solution if the city is to be maintained as an economically sound unit.

Accident Factors

In view of the many phases of the traffic-accident situation, it will be well to consider some of the ways in which engineering effort can provide or aid in providing greater safety. Causes of street and highway accidents lie in human behavior and in external conditions. The latter are particularly susceptible to engineering attack, and to the extent that they can make human errors and misjudgments less likely to occur, and less hazardous, this approach will have success. In the driving population there are a comparatively few accident-prone individuals who have more than their share of accidents. The remainder, comprising the great bulk of drivers, ordinarily use reasonable care, but among them are distributed more or less at random the great majority of accidents. The latter group of drivers has every conceivable kind of person in it with every degree of driving skill. These drivers have traffic accidents in every imaginable way. In this class of accidents the greatest promise of reduction is offered through engineering improvements.

Obviously roads and vehicles cannot be made foolproof, nor proof against reckless or criminal acts, nor totally proof against accidents. Engineering control methods cannot accomplish this miracle. It remains that the emphasis should be on engineering that will increase safety for the mass of good, bad, and indifferent drivers who have no especial proneness to accidents or criminally reckless tendencies.

Accidents may occur under any set of conditions, but if vehicles, roads, and control procedures and devices are designed to fit conditions of use and known patterns of human behavior, physical conditions will be provided under which, it is not too much to expect, accident frequency and severity may be greatly reduced. Traffic control devices such as those prescribed in the forthcoming revision of the "Manual on Uniform Traffic Control Devices" are of considerable value and are reasonably adequate in this respect. Their use is recommended where the need is justified by factual surveys and engineering judgment. It must be realized, nevertheless, that this equipment is of little benefit without public understanding and support or without enforcement of the regulations pertaining thereto.

Responsibility of the Engineer

The driver is entitled to roads and vehicles safe for reasonable use. He is entitled to a factor of safety that will give him a substantial degree of protection against the hazards over which he has no control. Among such

hazards are acts of other drivers; acts of pedestrians; such physical features as blind intersections, and faulty vehicle design or maintenance, which may result in poor daytime or nighttime visibility; inadequate signing; and uncontrolled or unrelieved congestion.

A typical problem in highway design has to do with vehicle speed. Important basic data for highway design are the speeds at which reasonable drivers will operate under good driving conditions. It has been found, for instance, that when conditions are such that the only limitations on speed are the capability of the machine and the desire of the driver, the majority of drivers want to make "good time" but do not want to go immoderately fast. Under these conditions speeds range from 25 to 80 miles per hour; only 40 percent go faster than 50 miles per hour, and 17 percent go slower than 40 miles per hour. The application of such data to road design is an engineering approach to the safety problem.

A major possibility for traffic accident reduction through safety engineering lies in making highway use safer during the hours of darkness. Though less than a third of the traffic is at night, about 65 percent of the traffic fatalities and 48 percent of all traffic accidents occur at night. More adequate street and highway lighting at properly selected locations and better vehicle lighting would pay large dividends in lives saved and property damage reduced.

The Engineering Attack

The type of highway that can be built in any given location depends fundamentally on the traffic requirements and the funds available. In congested regions reasonable taxes, if used for highway purposes, can provide multi-lane divided roadways, grade separations, controlled access, lighting, and all the other safety arrangements yet devised. But for thousands of other miles of important roads the cost of such complete improvements is not within the capacity of the public purse.

Since roads and streets cannot be made completely accident-proof or foolproof, the only feasible road engineering solution to the accident problem is to build into the road all of the known safety features applicable to its type or class. This will involve due attention to all available facts concerning driver behavior and vehicle characteristics, prevailing and anticipated. On existing improved roads it will involve careful study and treatment of specific locations potentially and actually hazardous from the standpoint of modern operating practice. Dependent on traffic conditions, improvements for safety will range from treatment of hazardous spots to the construction of controlled-access express highways. The best way to get safety into a highway is to build it in during the original construction.

These objectives may be reached through engineering methods, but to do so greater attention must be given, not only by engineers but by administrators and public officials as well, to the accident problem. There has been a general lack of appreciation of the extent to which accidents can be reduced by application of engineering principles and techniques.

Opportunity to Improve Engineering Contributions To Safety

It is not enough to say that greater attention must be given to engineering for safety. All designs of roads and vehicles and all operational plans must be subjected to appraisal of the safety factors, both physical and economic. But who is to do it? Much engineering knowledge is available in this area of highway engineering, but it has not yet had the extensive application so vitally needed. The reason is natural enough. Legislative and highway administrative officials are under tremendous public pressure to produce a large mileage of highway improvements. This makes for a continuing conflict with the engineer as he strives to employ the more modern standards of design and work toward safer operating conditions. Added emphasis on the application of safety fundamentals is needed at other places too. In education, undergraduate curricula are, properly, so heavily laden with the fundamentals of engineering science as to allow little or no room for specialization in the application of engineering science to safety problems. However, an excellent opportunity presents itself to stress the importance and basic principles of safety in existing courses dealing with design, construction, and operation.

If highway traffic safety is to attain its maximum benefits through engineering measures, engineers must be trained, given experience through well organized in-service training, and placed in responsible positions at key points in organizations with reasonable assurance that they may find an opportunity to pursue their professional careers with compensation commensurate with their ability and experience and with assurance of continuity in the tenure of their positions.

A pressing need at this time is for a greatly increased number of well-trained, experienced traffic engineers and for a closer departmental liaison among design, construction, maintenance, and traffic engineers. The training of specialists in traffic engineering will require time. It can be expedited by the establishment of graduate fellowships at engineering colleges for major work in traffic and safety engineering. This, of course, will involve contributions of funds to universities and colleges for this purpose.

The information now available to the engineer from accident records is quite weak both as to amount and quality. There can be no doubt that an improved accident-report form, providing more pertinent data on roadway conditions, and greater volume of better accident-reporting would be a valuable aid to the engineer in the determination of design treatments. There is need also for more intensive analysis of accidents both by closer scrutiny of accident reports and by making special accident investigations to develop more definite knowledge concerning the elements of highway design and construction which enter as causative factors. More intensive investigation and analysis should also be designed to disclose faults or defects in the design, material, or construction of the vehicle or vehicles involved or their component parts; and these matters should be directed to the attention of those persons in a position to effect remedies.

For immediate needs much could be done through intensive educational programs and through conferences for engineers arranged through cooperation between the governmental authorities in charge of road and street work and other highway groups, vehicle manufacturers, and agencies concerned with safety.

Value of Research

Up to this point emphasis in this report has been on action now through proven techniques and procedures. From the long-range viewpoint equal emphasis is warranted on the need for basic research. There are many areas of engineering for safety ir which information is nowhere near complete and in which the search for new knowledge should be greatly intensified. For example, the study of driver behavior and characteristics in relation to engineering problems is of cardinal importance. Yet in this area of research the surface has scarcely been scratched. The relation of highway factors to accidents has only recently begun to receive

the attention which it deserves, and indications are that future research will prove highly productive. Much more needs to be learned about practical road and street capacities under various conditions. The need for some new method of lighting the highway from moving vehicles with safety to all is generally acknowledged. Agencies which can conduct such researches should be urged to do so, for only through application of research findings can many of the fundamental causes of accidents be effectively dealt with. Interested groups should contact the Highway Research Board which, through its new Research Correlation Service for the American Association of State Highway Officials, is in a position to be of practical service.

Effect of Legal and Regulatory Provisions

Legislatures and regulatory bodies have promulgated many requirements concerning the sizes and weights of commercial vehicles, their design, construction, and accessory equipment. Frequently these requirements have been incompatible to the extent that compliance has been difficult or impossible. In some instances, the design of vehicles has been adversely affected and the principal intent of the law or regulation has not been realized. The result has been, probably by inadvertence, to cause such vehicles to be less safe for operation or to cause some uncontemplated adverse design changes. It is strongly urged that legislative or regulatory bodies, when undertaking the establishment of provisions affecting the design and construction of motor vehicles or appurtenances therefor, secure competent and impartial engineering advice to determine whether or not the language proposed would accomplish the purpose intended and insure against the evils above outlined.

Recommended Action Program

1. It is recommended that provision be made for continuous and intelligently planned programs of publicity, education, and law enforcement, without which the maximum benefits of engineering contributions to traffic accident reduction cannot be obtained.

a. There is particular need to impress legislators and administrators with the fact that engineering standards cannot be translated into highway safety unless adequate funds and suitable engineering personnel are made available.

b. The education of the general public in the safe use of vehicles, highways, and streets, ranks high in importance. Engineering can accomplish much in accident prevention, but even with the finest possible engineering effort, the attitude and actions of individual pedestrians and drivers will still be prime factors in accident causation.

c. Particularly in this era of overage vehicles, an urgent request should be made of every motorist to fulfill his fundamental, moral, and legal responsibility by maintaining his vehicle in safe operating condition.

d. In the field of formal education, more fellowships for traffic engineering training at the graduate school level should be provided at American colleges and universities. To the extent practicable, the teaching of traffic safety and operation principles should also be incorporated in standard college and secondary and elementary school courses.

e. Intensive educational programs and conferences on traffic safety and operation principles should be extensively conducted.

2. Within State and municipal jurisdictions, there are many public officials and groups whose efforts are directly or indirectly related to traffic safety. Planners, housing officials, engineers of highway and street design, construction, maintenance, and operation, police, educators, and the various safety organizations and civic groups are examples of this distribution of interest. There is a genuine need for creation of a practical means for effectively coordinating the everyday and long-range safety efforts of such individuals and groups. It is recommended that prompt action be taken by the appropriate governmental agencies to attain this objective.

3. Recognizing that greater safety on the highway can be obtained by a more intensive application of sound engineering and maintenance measures, it is recommended that trained engineers with proper experience be placed in the appropriate organization structures and given adequate remuneration and assurance of continuity in tenure of their positions.

4. In specific recognition of the need for better staffing of official agencies concerned with highway engineering problems, it is recommended that there be established:

a. In each State highway department, a division responsible for the application of engineering measures in the field of traffic operation and control. This division should be comparable in authority to other principal divisions, such as design, construction, and maintenance. It is very important that engineers trained in traffic operation principles be employed also in the design division.

b. In cities having more than 100,000 population, a traffic engineering unit comparable in authority and influence to other major divisions of the department of public works or corresponding organization.

c. In cities having between 50,000 and 100,000 population, at least one full-time traffic engineer vested with sufficient authority to insure the adoption of appropriate engineering measures for traffic operation and safety.

d. In cities having less than 50,000 population, an engineer, preferably the director of the department of public works, the city engineer, or some member of his staff, with qualifications and experience necessary to perform the functions of traffic engineering.

5. It is recommended that every effort be made to continue and advance uniformity in roadway signing, signaling, and marking, in the design of roadways and structures, and in lighting devices and safety appurtenances required or used on motor vehicles. Administrative authorities are urged to follow the general standards recommended elsewhere in this report.

6. It is recommended that greater weight be given to traffic engineering and safety considerations at the design stage of vehicles and highways. Such considerations have, in the past, been subordinated on occasion to matters of appearance and economics. Safe utility of a vehicle or highway is best assured when safety features are built in at the time of construction.

7. It is recommended that diligent examination and study be made of all existing roads and streets to detect locations of undue hazard and to correct or improve such conditions through application of the appropriate engineering or control measures.

8. It is recommended that there be established an effective and continuing liaison among motor-vehicle manufacturers, road builders, and operations engineers for the purpose of promoting closer coordination of (1) vehicle design, (2) the geometric and structural plans for streets and highways, and (3) the plans for operation. Such liaison will have its maximum value if the participants are persons of high rank in the phase of highway transportation which they represent.

9. Traffic safety should receive greater emphasis in urban redevelopment and new land development plans. It is recommended that hous-

ing, planning, and engineering officials engaged in or responsible for such work consider the traffic safety features of all such proposals and introduce, wherever justified, added facilities or revised street and land use plans to accommodate in a safe manner the travel requirements of the motorists and pedestrians affected. Cooperative action between planning authorities and highway engineers can do much toward minimizing accident hazards.

10. It is recommended that research into human and physical factors relating to traffic safety be greatly extended and intensified. Agencies in a position to conduct such research should be urged to undertake projects and to contact the Highway Research Board of the National Research Council, which is in a position to suggest worthy projects and otherwise to aid as a research "clearing house."

11. It is recommended that definite provisions be made for the modernization of all principal highways and streets so as to furnish safe traffic-operating conditions for the foreseeable future.

12. In proceeding with a modernization program, the standards, policies, and guides developed after exhaustive traffic and engineering investigations by the American Association of State Highway Officials, the Public Roads Administration, and other appropriate agencies, are recommended for general application.

13. It is recommended that sufficient width of right-of-way be acquired, and the necessary access control be provided, on arterial routes so as to reduce hazard, increase the ease of driving, minimize obsolescence, and protect the investment in the improvement.

14. It is recommended that the improvement of the farm-to-market, to school, to home, to work types of secondary roads and streets be such as to make them safe for-year-round use.

15. In recognition of the unusual hazards at railway and highway crossings at grade, it is recommended that these crossings be eliminated with priority determined on the basis of hazard and economy of traffic operation. Provision should be made for adequate protection of existing railway grade crossings where the construction of separation structures is not feasible. Full and consistent use of the Federal funds authorized under existing Highway Acts of the Congress for railway grade-crossing-elimination and protection is recommended.

16. It is recommended that sidewalks and other pedestrian facilities be provided by appropriate means on highways and streets where justified by the volume and character of vehicle and pedestrian traffic.

17. It is recommended that a combination of highway maintenance operations be so conducted as to provide a smooth, skid-resistant surface; safe, even shoulders; adequate drainage; and a clear right-of-way.

18. It is recommended that modernized street lighting be applied on main urban streets and on the more hazardous sections of highways, particularly near the entrances to municipalities, where there is considerable pedestrian traffic. The recently issued "Recommended Practice of Street and Highway Lighting" of the Illuminating Engineering Society will be a helpful guide in this work.

19. With further respect to visibility, it is recommended that means be employed to utilize vehicle headlighting to better advantage by designing structures and other roadway elements with surfaces of such color, texture, light-reflecting quality, area, and geometric position with respect to approaching vehicles that the presence, dimension, and position of these roadway elements will be disclosed to the maximum extent practicable.

20. Traffic hazards can frequently be reduced by relatively simple or localized engineering treatments. The following are recommended as typical applications:

a. Use of raised median strips on wide, heavily traveled streets.

b. Use of adequate turning radii at intersections.

c. Intersection channelization.

d. Provision of additional lanes for trucks on grades and special facilities for busses and other mass-transit vehicles.

21. It is recommended that appropriate authorities adopt as a working standard the Manual on Uniform Traffic Control Devices, prepared by joint effort of the American Association of State Highway Officials, the Institute of Traffic Engineers, and the National Conference on Street and Highway Safety. The manual, a revision of which will be issued this year, contains recommended practice for the application, design, location, installation, and maintenance of highway signs, traffic signals, pavement markings, and islands. Substantial conformance with its provisions on streets and highways built with Federal funds is required by the Federal-Aid Highway Act of 1944.

22. It is recommended that the basic principles of Article VI of Act V of the Uniform Vehicle Code be adopted. Article VI provides for the establishment of speed restrictions and, among other provisions, authorizes speed zoning and prescribes separate day and night speed limits.

23. The principle of speed zoning, based on adequate factual investigation, is recommended for wider application. The practice of marking safe operating speeds on curves is especially commended.

24. It is recommended that the practice of establishing low speed limits but permitting high tolerances be discontinued.

25. It is recommended that full use be made of all pertinent and available facts on traffic operation in the design, redesign, and control treatment of streets, highways, and vehicles.

26. It is recommended that plans be made for the provision of off-street parking facilities as the ultimate solution of the parking problem in congested metropolitan areas. These facilities should be designed and located with respect to terminal requirements and, wherever practicable, with ready access to preferential type streets.

27. It is recommended that the best possible use be made of curb parking space. Angle parking, though it accommodates more cars along the curb, frequently creates hazard and interference with moving traffic.

28. It is recommended that additional use be made of the one-way street principle, wherever practicable, to increase street capacity and improve safety.

29. It is recommended that channelization be used more extensively to guide vehicles on a safe course through large-area intersections and to provide safe refuge points for pedestrians.

30. To increase further the protection afforded the pedestrian, additional facilities, such as loading islands, marked crosswalks, sidewalks, overpasses and underpasses, and barricades, should be constructed where pedestrian and vehicle volumes and roadway conditions warrant.

31. It is recommended that consideration be given to the segregation of vehicles according to their performance characteristics. Designation of certain streets, routes or separate lanes for special classes of traffic, such as trucks or busses, may often facilitate movement and reduce operating hazards.

32. The limits of vehicle size and weight recently proposed by the American Association of State Highway Officers after ratification by a majority of the States, are recommended for general adoption.

JOB and EQUIPMENT IDEAS

Send in your contributions to this idea exchange and help road building progress. ROADS AND STREETS will pay a minimum of $10.00 each for any publishable field or office methods or shop kinks. Why not pass this along to your staff and encourage them to send in brief "how we did it" descriptions, rough sketches or snapshots.

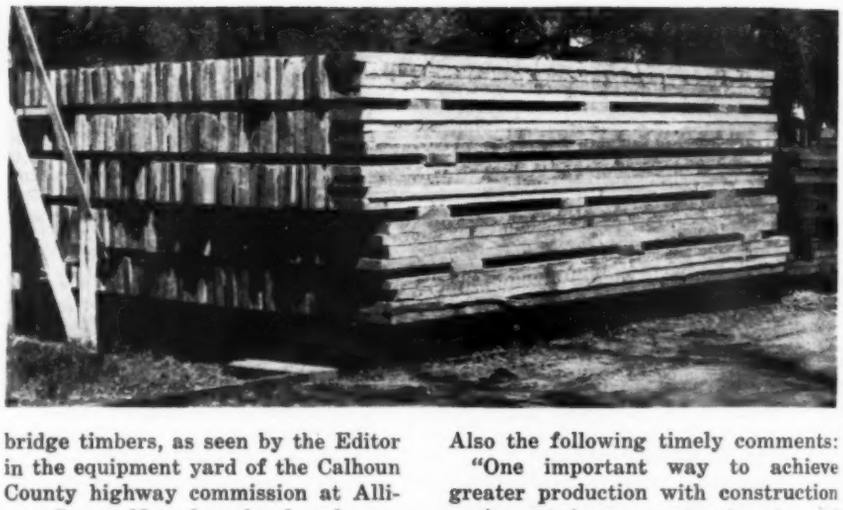
"Train" Loading Boosted Scraper Output

Push tractors are standard now on scraper loading, and snatch tractors are commonly used on self-powered scrapers. But "train" or "procession" loading is still a novel idea. At least we seldom run across it. Here is a picture of such an operation on a railroad grading job in Missouri last year. J. D. Armstrong Co. of Ames, Iowa, is the contractor. According to Mr. Armstrong, who enthusiastically stumps for the method, the idea is to route all your scrapers in a continuous train. No unit gets out of line. None of the "free for all" scampering around, each tractor tearing away on its own and the push dozer operator catching 'em as he can.

Rather, each tractor operator pushes the rig ahead during some part of the time he is loading his own pan. Each unit pulls away when loaded. The machines are kept uniformly spaced after some practice There are always two, three or four outfits in contact in the loading train. Saves congestion and confusion—and money—Mr. Armstrong believes.

Good Example of Careful Lumber Storage

Lumber is pure gold these days and it pays more than ever to take proper care of what you have. The snapshot shows a good example of well-stored bridge timbers, as seen by the Editor in the equipment yard of the Calhoun County highway commission at Allison, Iowa. Note how level and even the 4x12's are supported. All are stocked edge-up, for good drainage, except the "book end" row at either end. Every fourth plank there's a row of sleepers to let in air.



Properly-Constructed Cuts, Fills Aid Drainage, Minimize Delays

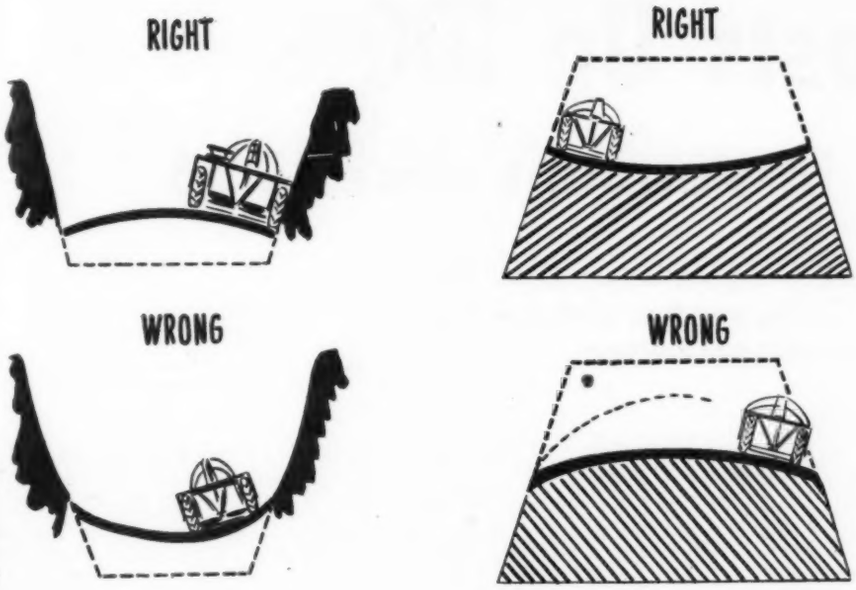
You would think that every contractor would keep his grade properly crowned and ironed out during grading operations to aid drainage, but we see plenty of carelessness in this respect. From R. D. Evans, installation manager of R. G. LeTourneau, Inc., come the accompanying sketches of the right and wrong way to do it. Also the following timely comments:

"One important way to achieve greater production with construction equipment is to construct cuts and fills properly, so that spring rains will not impede progress because of improper drainage.

"Well-drained cuts and fills contribute to job efficiency. Proper compaction will be advantageous during wet weather, for the delay usually experienced after a rain will be shortened due to the increase in bearing power of soil that has met compaction requirements.

"Additional equipment needed to work in badly drained cuts and fills detracts from job efficiency, increases costs, prolongs grading time, delays surfacing, concreting and subsequent work.

"Plan efficiently to eliminate 'lost equipment hours.'"



★ A crowned cut (above) affords temporary drainage ditches, and sheds water to them as the cut is lowered. Incidentally, a cut shaped the right way keeps scraper from slipping away from slopes.

★ An uncrowned fill (above) is the right way. However, lateral ditches spaced along the right-of-way aid drainage. They will drain off and prevent water from pooling in the center of the fill

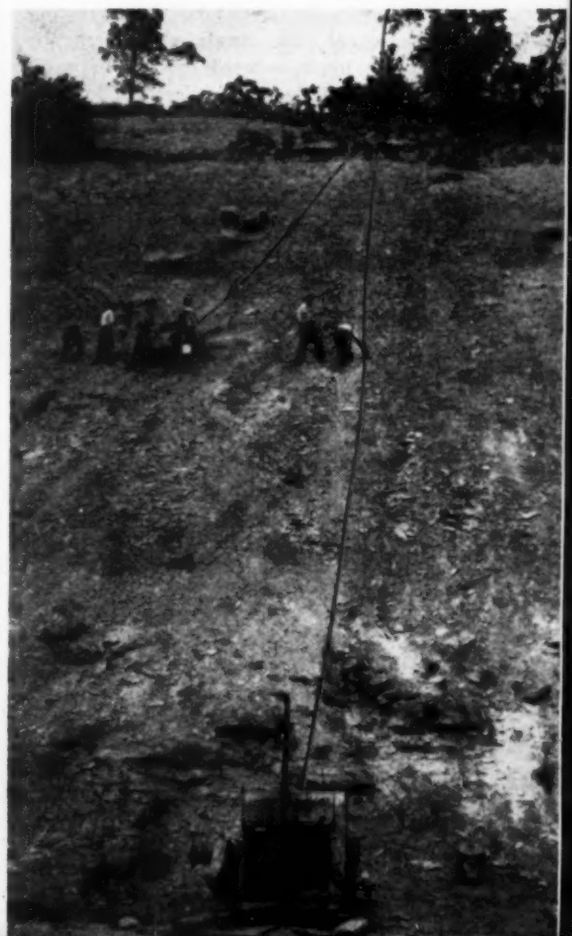
★ (Upper left): General view of the cut, which is a "whooper." (Lower left): View of car. Note straw covering at left, placed to protect plants just set out. (Right): Showing one position of the winch unit and cable. Note anchor pole at top. Car spotted on left, half way up bank

Mr. Evans points out that with one of his company's 15-yd. scrapers a loss of two minutes on each trip as a result of poor drainage and rough going will retard production from 20 to 24 cu. yd. per hr. on a 2,000 cu. ft. one-way haul, depending on the type of soil. This represents a loss ranging from 20 to 32 per cent.

"Cable Car" Expedites Planting of Big Cut Slope

How would you go about it if you had the job of setting out a flock of small shrub roots, tree seedlings or grass tufts on a very large backslope? We don't have any of the details, but a good labor-saving idea is presented in the accompanying photos.

The workers here used a small "car", consisting of a wooden box mounted on wheels, which was drawn up and down the slope by means of a 110-ft. winch line. The line was anchored at successive points at the top, using a convenient pole or tree, and several cable paths were fanned out from any one top hitch position by sliding the power unit along the hitch line. The car certainly must have saved a lot of laborious lugging of digging tools and set-out material. Photos courtesy of staff of Fred Swineford, chief, bureau of construction, Ohio department of highways.



Winter Costs Up 100%

in Vermont since 1936

. . . according to following data issued to the Vermont traveling public. Sanding and de-icing costs have gained largest percentage.

THE annual cost of keeping Vermont's state highways open for winter travel has nearly doubled in the past ten years, according to figures released by commissioner of highways, Hubert E. Sargent.

The maintenance bill for the winter of 1935-36 amounted to $316,801.22, as compared with $592,064.37 for 1944-45. So far this winter, according to the commissioner, the cost has exceeded the same period of last winter by $46,046.94.

Commissioner Sargent pointed out that the cost per mile for winter maintenance has increased from $180 in 1935-36 to $350 in 1944-45, as more work has been required each year and as prices for labor, equipment and materials have gone up. "This increase in cost per mile," the Commissioner said, "reflects the growing share of our maintenance money which must be used for winter work to satisfy the public demand for better and safer driving conditions."

Sanding and Ice Control, Biggest Gain

The Highway Department's records reveal that during the first few winters after the state system was created in 1931 the most expensive single item was plowing snow. By 1935 the cost of sanding and ice control exceeded that of plowing, and at periods since then it has been over three times as great.

"Sanding and ice control has become the most important phase of our winter maintenance problem," Commissioner Sargent stated. "Snow plowing naturally must be done when it storms, but the prevention of ice by the use of chemicals, or the covering of ice with sand or similar material, is a constant and expensive process."

Chemicals, such as sodium chloride and calcium chloride, are used by the highway department under certain temperature conditions to prevent the formation of ice on pavement. Applied along the center of the road during a snow storm, for example, the chemical is spread out toward the edges by traffic and melts the snow before it becomes packed down into ice. During a sleet storm, when sand is ineffective because it freezes over quickly, the chemical often will keep an unfrozen strip open.

The Highway Department also uses sodium chloride and calcium chloride mixed with the sand or cinders to keep that material from freezing and to make it stick to slippery roads. During the past few years the Department has found that the use of chemicals has aided in maintaining a great deal more bare pavement than was formerly the case.

Besides plowing, sanding and ice control, winter highway work consists of erecting snow fences, thawing frozen culverts, opening ditches, turning water off the roadway, shoveling out traffic signs, cleaning up slides and a multitude of other items which are necessary to maintaining safe motor travel through the cold months.

How Plowing Is Done

All state highways in Vermont (except the one through Smugglers Notch) are kept open to travel by the Highway Department. Except for the actual duration of a severe storm, or when it is raining and freezing, motorists can be confident of finding good winter driving conditions on the state system, the Commissioner indicated. The state plows start out as soon as snow commences to fall, and keep at it until the storm is over and the roads clear. Sanding and ice control measures are carried on continuously as may be required, although under existing labor shortages, the Commissioner pointed out, often must be left until the plowing is finished. He emphasized that all parts of a route cannot be taken care of at the same time, and also that conditions may change so rapidly over a large area that considerable time is required to cope with them completely.

In commenting on winter driving, the Commissioner said that during bad weather a motorist should not start on a long trip unless it is absolutely necessary. "Anything can happen in a storm, especially at night, no matter how good a driver one is or how much money is spent for winter maintenance," he said. "One car or truck across the road can hold up traffic, including the snowplows, for hours." He recommended that drivers in winter always be equipped with chains and shovels in case of emergency.

Winter	Miles	Total Cost	Cost Per Mile
1935-36	1,761	$316,801.22	$179.90
1936-37	1,761	325,434.93	184.80
1937-38	1,763	342,190.95	194.10
1938-39	1,749	441,531.02	252.45
1939-40	1,749	472,546.24	270.18
1940-41	1,751	509,137.77	290.77
1941-42	1,776	516,073.68	290.58
1942-43	1,777	446,809.06	251.44
1943-44	1,777	541,815.28	304.90
1944-45	1,797	592,064.37	329.47

Winter	Snow Removal	Sanding and Ice Control	Snow Fence	Miscellaneous Work	Total
1935-36	$130,066.74	$140,601.95	$21,262.75	$24,869.78	$316,801.22
1936-37	65,155.94	188,732.46	21,580.86	49,965.67	325,434.93
1937-38	60,539.40	217,575.73	24,495.09	39,580.73	342,190.95
1938-39	121,663.11	249,669.65	17,369.09	52,829.17	441,531.02
1939-40	141,362.22	274,441.83	16,885.43	66,856.76	472,546.24
1940-41	104,252.88	337,776.08	17,996.73	49,112.08	509,137.77
1941-42	114,086.58	297,354.62	21,042.69	83,589.78	516,073.68
1942-43	146,130.72	222,637.51	23,141.81	54,899.02	446,809.06
1943-44	169,455.79	258,681.63	26,050.66	87,627.20	541,815.28
1944-45	203,743.66	264,446.51	31,013.89	92,860.31	592,064.37

Ohio's state surface treatment program this year comprises 486 miles of bituminous work in 36 counties, estimated at $784,000.

Snow Removal on N.Y.C.'s Elevated Roadways

ONE of the longest elevated structures in New York City is the West Side Elevated Highway. This structure is a divided highway with three traffic lanes in each direction and is approximately 4.6 miles in length. The method of snow removal followed on this structure, according to the N.Y.C. Department of Sanitation, is to plow the snow to the extreme sides, plowing it to the gutter areas and piling it up against the outside girders. This reduces the traffic area somewhat, but with three lanes of pavement this has not proved to be an obstruction to traffic. The snow is left there to melt and run off through drains in the pavement surface, these drains being located directly against the outside curbs and girders.

This method has proved highly satisfactory as well as economical after several years' trial. Former methods were to "blow" it over the sides to the street below or to cart it away, both relatively more expensive methods.

On the Triborough Bridge, according to George E. Spargo, recently general manager, Triborough Bridge Authority (now deputy mayor of New York), a structure of approximately 3 miles in length, the method used is to plow the snow to the outer sides, then pick it up with a rotary plow which elevates it and blows it over the sides. This method can only be used where the area below is not affected by the snow. If there were streets and buildings below, as along the West Side Elevated Highway, this method would prove very objectionable. The Triborough Bridge is over island property used for parks and institutional buildings and blowing the snow over the sides is not objectionable.

"Besides the snow removal," reported Mr. Spargo, "we find numerous occasions when we have a light fall which is too thin to plow but alternately thaws and freezes. At these times we cinder the bridge to make sure it is in a safe riding condition at all times. A considerable part of the yearly cost of caring for snow problems is the cindering operation. Our snow cost on the Triborough Bridge from November 1, 1944, through October 31, 1945, including supplies, was $5,606. This was a heavy year."

ARBA Giving Enlarged Inter-Amer. Training Program

The outstanding results achieved on a small scale in previous years assure the success of year-long training program involving 22 engineers from 16 South American countries.

REPRESENTATIVES of the U. S. Department of Commerce, the Public Roads Administration, the Office of Inter-American Affairs and the diplomatic corps, assisted the American Road Builders' Association in launching the Inter-American Highway Training Program at Washington during April.

Outstanding highway engineers and leading authorities in their several fields, over a five-week period, lectured to the engineers on all phases of engineering, construction, maintenance, operation, equipment, methods, transportation and financing. This series, supplemented by laboratory visits and work, is intended to furnish a complete grounding in the fundamentals of every aspect of highway and airport design and construction.

When the series of lectures was completed on May 17, the engineers embarked on a five-week inspection trip into Pennsylvania, Ohio, Indiana, Illinois, Iowa, and Wisconsin. Stopovers are being made at a number of highway departments, construction projects, maintenance demonstrations and manufacturing plants. The cooperation extended by state and county highway departments, contractors and manufacturers has made possible this practical field work.

On July 1 the men will take up individual assignments for more specialized training. Each engineer will participate in the actual engineering, construction and operation of highways and obtain "in the shop" knowledge of the machinery, equipment and methods used.

A visit to the Road Show planned for next Feb. 17 to 21 will be followed by an optional short course in traffic control to be conducted at Yale University's Bureau of Highway Traffic. The year of intensive training will be climaxed by a week spent in Washington evaluating and appraising the results achieved.

Glidden Leads Airport Session

H. K. Glidden, Eastern Editor for ROADS AND STREETS, was the leader for the day (May 16th) devoted to airport study in the lecture course being given the 22 South American engineers attending the ARBA's Inter-American Highway Training Program. Mr. Glidden discussed "Principles Involved in Designing and Constructing Airports." T. J. Kauer, Managing Director, Wire Reinforcement Institute, Washington, D. C., presented a paper on "Reinforced Concrete Runways and Taxiways."

The afternoon was spent inspecting the Washington National Airport, where Hervey F. Law, Airport Administrator, explained the factors involved in airport management and gave the engineers an "on the spot" discussion of the functions of the various facilities that go to make up a very busy air terminal.

Motion pictures, taken on difficult Civil Aeronautics Administration projects, were shown by Mr. Glidden. Mr. Law and Mr. Glidden worked together in CAA on the selection, design and construction of a considerable number of airports built for use by the armed forces as part of the national defense program. On the basis of this experience, these two men have prepared an engineering textbook covering the subject of airport design, construction and management which Harper & Bros. are bringing out in the very near future.

(Continued on page 122)

Excellent Papers Feature

ASCE Spring Meeting

THE American Society of Civil Engineers held its annual spring meeting on April 17-19 at the Bellevue Stratford Hotel, Philadelphia, with about 850 members and guests registered. This first spring meeting in four years marked the resumption of the Society's normal activities and saw many an engineer fresh from military service renewing acquaintances and trying to catch up on the latest home-front thinking.

Rep. Carl Hinshaw, Pasadena, Calif., the only member of Congress in the Society, urged members of the ASCE to shed their aloofness toward public affairs and to serve the people directly, rather than continue as "servants of the servants of the people" which, he said, they are now doing by providing the technical knowledge in various governmental undertakings.

Speakers at the opening session were Mayor Bernard Samuel of Philadelphia and Edward Hopkinson, Jr., who discussed the sewerage, airports, subways, hospitals, highways, playgrounds, water works, housing, schools, traffic and other public works involved in Philadelphia's proposed $78,200,000 civic improvement program. W. W. Horner, St. Louis consulting engineer, President of the national Society, responded to Mayor Samuel's welcome.

The sessions of the various technical divisions provided papers and discussion by engineers of national prominence covering topics of current interest. The policy adopted by the Programs and Technical Meetings Committee of allowing ample time for each paper presented, was rewarded by the spirited discussion and participation of the audience following almost every paper. The sessions of the highway division and the soil mechanics and foundations division covered subjects of special interest to ROADS AND STREETS readers.

Planning and Research Endorsed

Roy Crum, Director, Highway Research Board, discussed the results obtained from queries made to state agencies by letter and personal contacts. The number of subjects suggested, each entirely worthy of full investigation, covered a wide range of subjects. The interest which civil engineers have in such matters as finances, economics, law, development, legislation, aerial photography, functional design, climate and weather, night visibility, and vehicle lights, in addition to the many technical problems, was clearly shown by Mr. Crum's talk. The functional operations of the Highway Research Board were described as consisting of (1) conducting forums, (2) dissemination of information, (3) committee work, and (4) visits to field agencies. The need for volunteers to serve on the various committees was stressed.

Bridge an Airport Hazard

Mr. Frank Masters, Harrisburg, Pa., consulting engineer, discussed the development of plans for Philadelphia's Penrose Avenue bridge over the Schuylkill river. A high-level bridge (135 ft. in the clear above mean high water) was chosen as being cheaper than a tunnel and more practical than a drawbridge. 30 to 60 ocean-going vessels use the river at this point daily. The overall length of the bridge, including approaches, is to be 8910 ft. Maximum grades of 3% have been agreed upon. The designers feel that traffic lights and intersections will retard traffic fed in on a 6-lane highway enough so that 4 lanes on the bridge will prove adequate. One major consideration in the bridge design was the requirement that the structure be kept as low as possible so that it would not constitute an unnecessary hazard to operations at Philadelphia's Southwest Airport. Of 6 proposed designs, a cantilever type was selected.

Tax Ratables Affect Freeways

Charles M. Noble, state highway engineer of New Jersey, proposed unification of several small communities in an urban area as a large single tax area—something most communities have shunned to date—as a means of speeding up construction of much needed freeways and parkways.

"There are two main cost elements involved in providing new traffic facilities," Mr. Noble stated, "real estate and construction costs, and the loss in tax ratables to the state, county and local governmental subdivisions. The latter presents the greatest stumbling block, particularly in urban areas made up of a succession of small boroughs or towns where a projected highway route may cut through several communities and the construction might destroy a sizable part of the total ratables in each community.

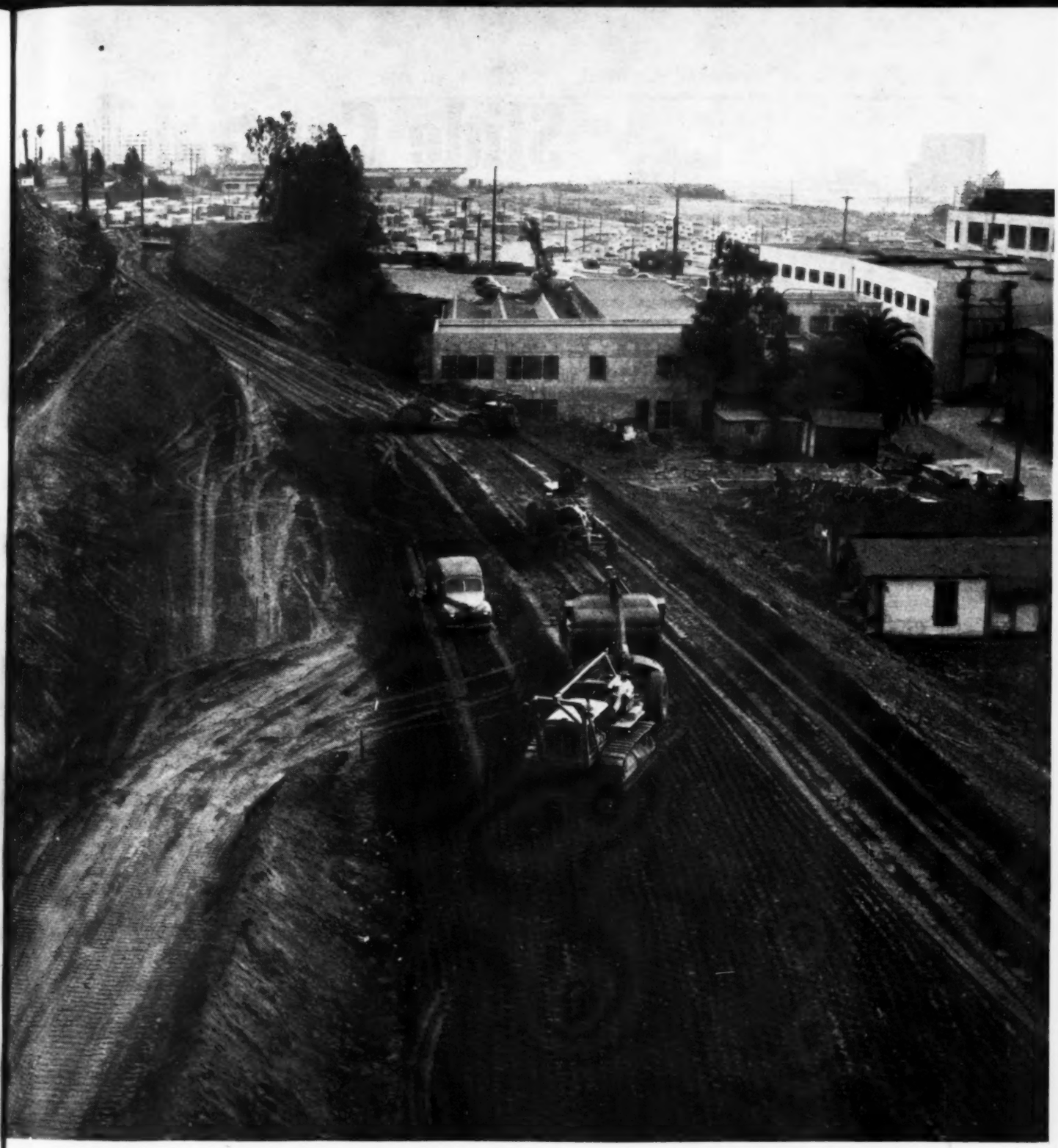
"This condition may be contrasted with the case where a traffic relief artery is constructed through a single large city. In this case, it is generally possible to select a location through a continuous blighted belt and in addition, although the same acreage of land is utilized as for a corresponding distance through a series of small communities, the proportionate loss in ratables is very much less for the larger city, and may be more readily absorbed without financial distress during the interim period required to restore the tax values in the blighted areas that will be brought about because of the improvement and the relief from traffic congestion. There is no such cushion in the smaller communities to take up the shock, and consequently the officials and citizens in towns in the path of through traffic relief arteries are most apprehensive over the loss in ratables and generally oppose the proposed improvement. They want the improvement, but want it in someone else's town.

"Sacrifice must be made in order to break this bottleneck, or stagnation and decay will continue which will not only be disastrous to the local town but also the county and eventually the state, for the flight of population and industry is not confined to cities, but affects entire states and regions."

In suggesting inclusion of such communities in single tax areas, Mr. Noble said:

"If a community through which a trunk artery is projected were offered forgiveness of a substantial portion of state and county taxes for a period of years (the forgiven portion being assumed by the surrounding towns) it is believed that it would relieve the small community of a severe financial strain and would be a sufficient in-

(*Continued on page* 121)



Picture of the Month

They're moving dirt on the first section of Los Angeles' new expressways! Peter Kiewit Sons' Company here is busy on a 1.6-mile section of Santa Ana Freeway, comprising the first highway contract on L.A.'s projected 70-mile, 2-axis, first priority expressway scheme. This photo is chosen as our May "Picture" not because of scenic beauty or any unusual methods or design feature depicted, but because it denotes *action*—action, foresight and effective leadership on a type of traffic relief needed in nearly all of America's metropolitan centers. The California Division of Highways with city cooperation has plans well along for additional contract sections.

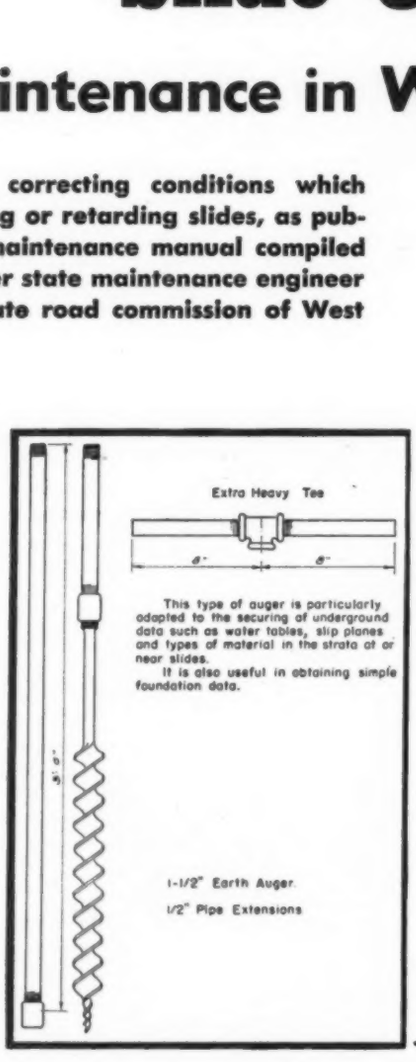
Slide Control

Maintenance in West Virginia

Practical suggestions for correcting conditions which cause slides, or for stopping or retarding slides, as published in the employees' maintenance manual compiled by E. L. Worthington, former state maintenance engineer and now commissioner, state road commission of West Virginia

THE words "slide" and "slip" are commonly used in connection with unwarranted movement of earth, and in order to have a distinction between those movements which come down onto the roadway and those in which a section of the roadway moves down below its normal elevation, the word "slide" is to be used in connection with the former, and the word "slip" in referring to the latter. In other words, earth *slides* down onto the roadway, and a fill *slips* out from the roadway.

The control of slides is of major importance in West Virginia, because of the prevalence of slides in practically every county of the state. There are numerous types of slides and almost without exception they are caused by the presence of water. The word "water" should be synonymous with the word "slide," and whenever a slide is observed, the first thought should be that water is present, and that its presence must be diverted or eliminated if the slide is to be permanently corrected.

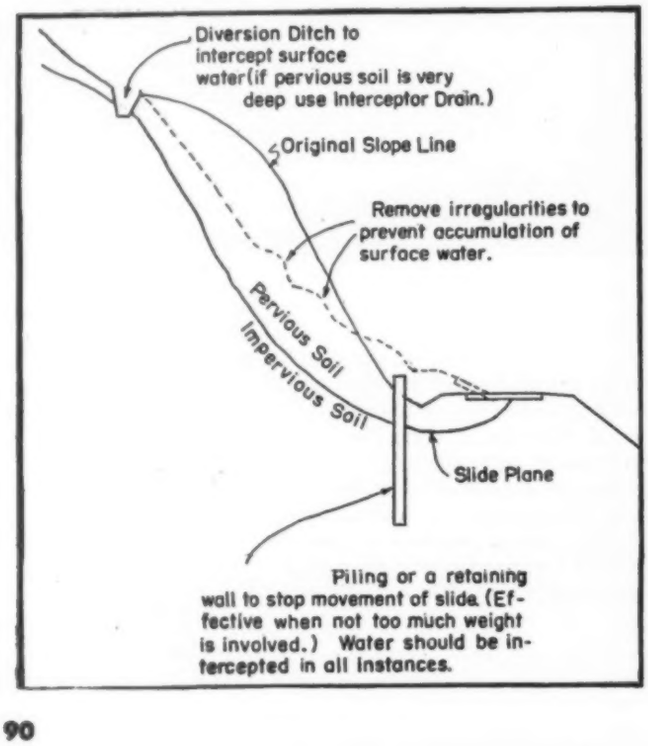

Extra Heavy Tee
This type of auger is particularly adapted to the securing of underground data such as water tables, slip planes and types of material in the strata at or near slides.
It is also useful in obtaining simple foundation data.
1-1/2" Earth Auger
1/2" Pipe Extensions

Water, The Culprit

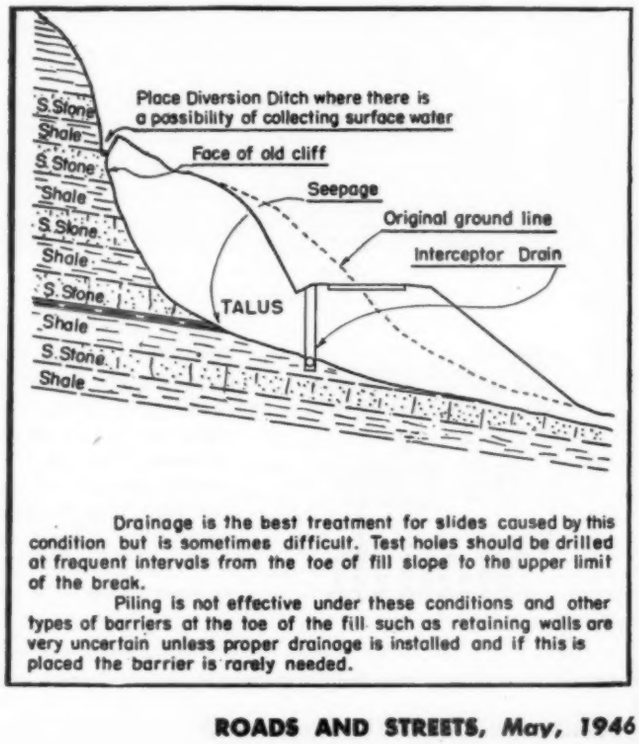
Ordinarily, when an earth or shale slope is dry there is little likelihood of any movement; however, the infiltration of water into a pervious type of soil upsets the equilibrium and causes the material to move, and when sufficiently saturated the material will, in some instances, flow almost like water down upon the roadway.

★ Fig. 1. Test hole hand earth auger

★ (Below left): Fig. 2. Typical conditions leading to talus slides near the bottom of cliffs or at foot of steep rocky hill. (Right): Fig. 3. Example of landslide which causes part of pavement to heave up


Diversion Ditch to intercept surface water (if pervious soil is very deep use Interceptor Drain.)
Original Slope Line
Remove irregularities to prevent accumulation of surface water.
Pervious Soil
Impervious Soil
Slide Plane

Piling or a retaining wall to stop movement of slide. (Effective when not too much weight is involved.) Water should be intercepted in all instances.

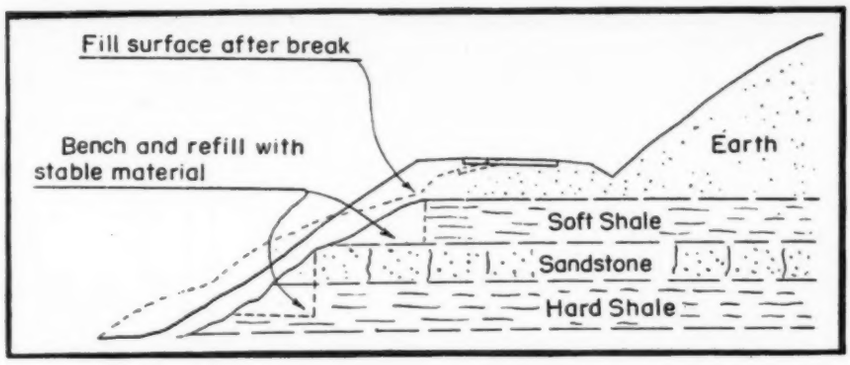


Drainage is the best treatment for slides caused by this condition but is sometimes difficult. Test holes should be drilled at frequent intervals from the toe of fill slope to the upper limit of the break.

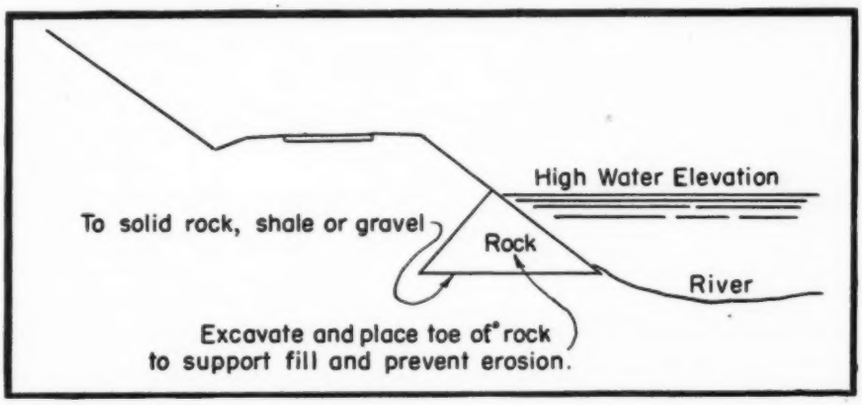
Piling is not effective under these conditions and other types of barriers at the toe of the fill such as retaining walls are very uncertain unless proper drainage is installed and if this is placed the barrier is rarely needed.

In other instances layers of pervious soil repose upon sloping layers of impervious material, such as rock, fire clay, or hard shale. The top of this layer of impervious material is a potential slide plane; however, as long as water is absent the friction is sufficient to keep the top layer of material from moving down on the roadway below, but when water either soaks down through the pervious layer to the slide plane, or gets to the slide plane from wet weather springs or water-bearing strata, it furnishes lubrication which overcomes the friction, and the top layer of material begins to move; and when the movement begins the earth mass cracks and lets additional surface water down to the slide plane, furnishing additional lubrication to accentuate the movement of the slide.

As soon as there is evidence of movement, the first thing to look for is water. In some instances water from wet weather springs high on a hillside will drain down and cause the slide. In other instances, which as a rule are more prevalent, seepage from water-bearing strata furnishes the water which causes slides. In other instances the natural slope surface drainage will provide sufficient water to start the movement of earth.



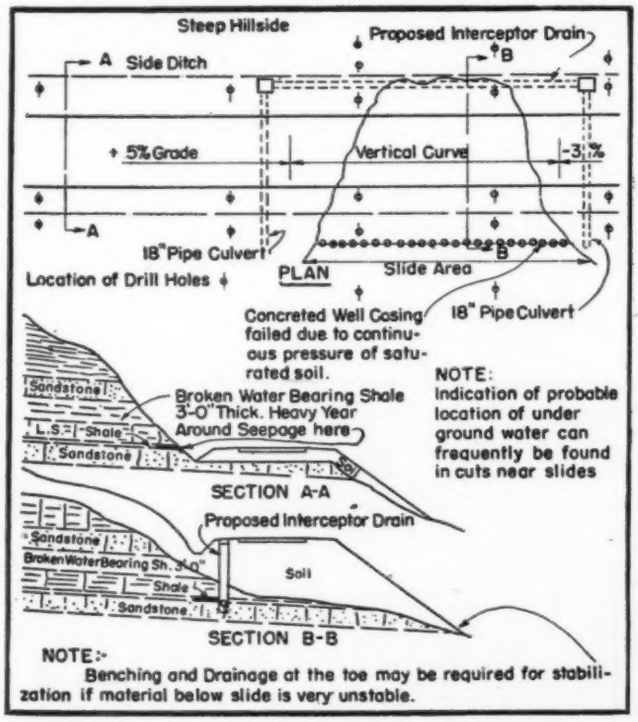
★ Fig. 4. Example of slide caused by soil with insufficient structural strength to enable it to repose on steep slope

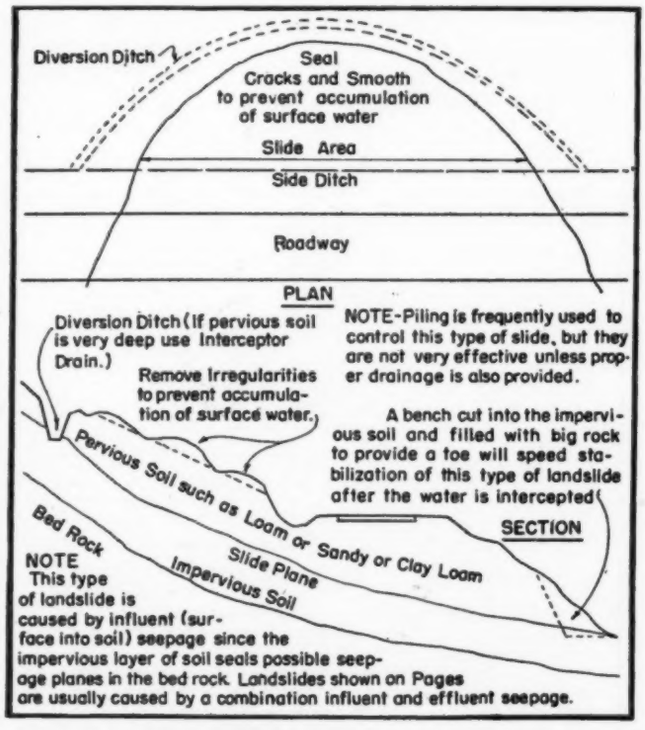

High Water Elevation
To solid rock, shale or gravel
Rock
River
Excavate and place toe of rock to support fill and prevent erosion.

★ Fig. 5. Example of fill slip due to toe of fill becoming saturated and sloughing into river

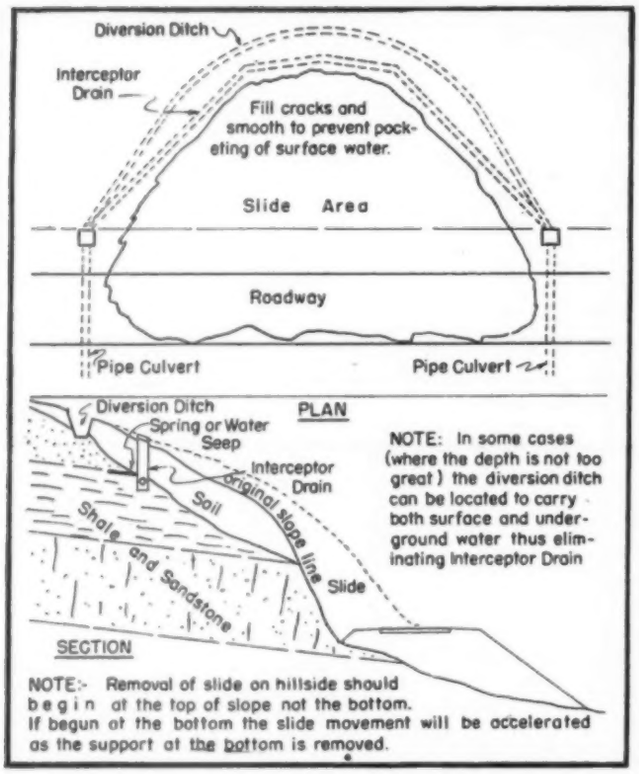
Determine Water Source

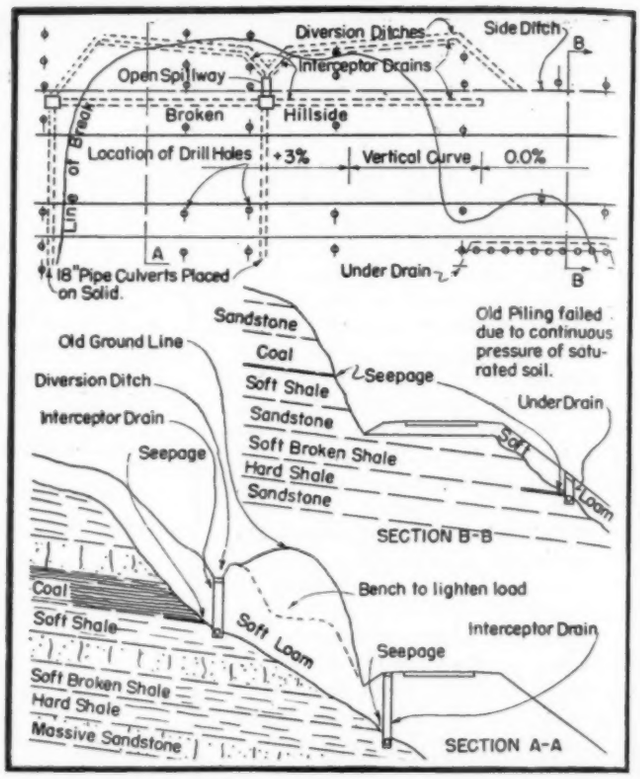
If the only source of water is wet-weather springs or natural drainage above the actual slide, the water can usually be diverted and carried away with diversion ditches; however, if the water is from water-bearing strata, it is very often difficult to determine the exact source of such water. The most practical method is to dig trenches or drill a series of holes at right angles to the strata. The hand earth auger shown in Fig. 1 is a very




Diversion Ditch
Seal Cracks and Smooth to prevent accumulation of surface water
Slide Area
Side Ditch
Roadway
PLAN
Diversion Ditch (If pervious soil is very deep use Interceptor Drain.)
Remove Irregularities to prevent accumulation of surface water.
NOTE-Piling is frequently used to control this type of slide, but they are not very effective unless proper drainage is also provided.
A bench cut into the impervious soil and filled with big rock to provide a toe will speed stabilization of this type of landslide after the water is intercepted.
Pervious Soil such as Loam or Sandy or Clay Loam
Bed Rock
Slide Plane
Impervious Soil
SECTION
NOTE
This type of landslide is caused by influent (surface into soil) seepage since the impervious layer of soil seals possible seepage planes in the bed rock. Landslides shown on Pages are usually caused by a combination influent and effluent seepage.

★ (Left): Fig. 6. Example of landslide caused by seepage from water bearing stratum which shows in rock cut near landslide. (Right): Fig. 7. Example of landslide composed of pervious top soil moving on impervious soil


Diversion Ditch
Interceptor Drain
Fill cracks and smooth to prevent pocketing of surface water.
Slide Area
Roadway
Pipe Culvert
Pipe Culvert
PLAN
Diversion Ditch
Spring or Water Seep
Interceptor Drain
Original slope line
Soil
Shale and Sandstone
Slide
SECTION
NOTE: In some cases (where the depth is not too great) the diversion ditch can be located to carry both surface and underground water thus eliminating Interceptor Drain
NOTE:- Removal of slide on hillside should begin at the top of slope not the bottom. If begun at the bottom the slide movement will be accelerated as the support at the bottom is removed.



★ (Left): Fig. 8. Example of treatment of landslide which covers but does not move roadway.
(Right): Fig. 9. Example of the treatment of landslide caused by seepage from more than one level.

handy tool for the drilling of these holes, as the material which is brought to the surface may be examined for type and for the presence of moisture.

When the seepage plane or planes are thus located together with the slide plane, the correction of the slide is simplified and the proper remedial measures may be applied.

The accompanying sketches show all of the more common types of slides. A careful study of these sketches will show the proper solution to apply in order to control such sliding areas.

It is quite common for a section of fill over a pipe culvert to slip out and very often such a slip is caused by a break in the pipe line, which allows water to seep into and upset the equilibrium of the mass of earth forming the fill. Therefore, when a fill over a pipe culvert begins to move, the pipe should be carefully checked for indications of leakage.

"Dry" Slides

There are what are known as "dry slides," usually involving shale or rock, which occur when the toe of a rock or shale slope is disturbed. (See Fig. 11). Where this condition prevails care must be exercised not to disturb the toe of the slope. If more width is required, the center line of the road should be shifted away from the stable slope, rather than to disturb the solid strata.

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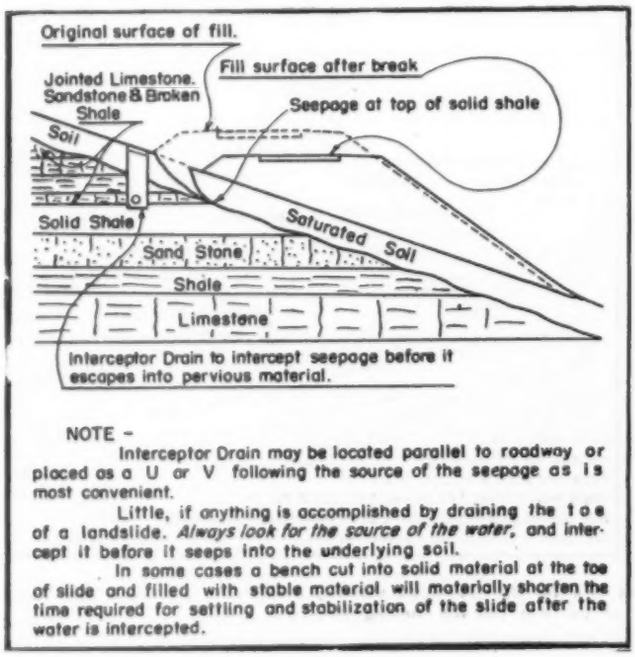
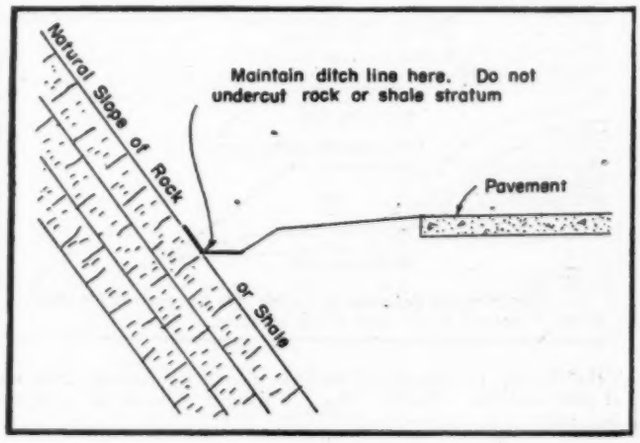

Original surface of fill.
Fill surface after break
Jointed Limestone. Sandstone & Broken Shale
Seepage at top of solid shale
Soil
Solid Shale
Saturated Soil
Sand Stone
Shale
Limestone
Interceptor Drain to intercept seepage before it escapes into pervious material.
NOTE -
Interceptor Drain may be located parallel to roadway or placed as a U or V following the source of the seepage as is most convenient.
Little, if anything is accomplished by draining the toe of a landslide. *Always look for the source of the water,* and intercept it before it seeps into the underlying soil.
In some cases a bench cut into solid material at the toe of slide and filled with stable material will materially shorten the time required for settling and stabilization of the slide after the water is intercepted.

★ Fig. 10. Slip of fill section on easy slope caused by saturation of soil by seepage which follows top of impervious shale or stone overlaid by jointed or broken strata

★ Fig. 11. Preventing dry slides of sloping rock or shale



Dozer-powered Spreader Box

aids hot-mix widening job

THE Kaw Paving Co. introduced something novel in the way of operational equipment and put the renovated items to work in widening and stabilizing the road shoulder on Highway No. 40-24 between Silver Lake and St. Mary's, Kansas.

The company contracted to build a 2-ft. asphalt strip on each side of the present concrete highway. It utilized diesel-powered motor grader to prepare the widening and a diesel track-type tractor to carry a novel "side ditch spreader box."

After scarifying the gravel shoulder, the motor grader, with an extra piece of steel welded to the right side of the blade, trenched away gravel and dirt to a depth of 8 in. and a width of 30 in. The attachment provided a neat cut, flush with the concrete. Then the strip was rolled and a 1½-in. layer of chat spread the full width of the strip by a truck-powered apparatus and a stream of liquid heated asphalt played along the edge of the pavement.

In spreading the asphaltic concrete mixture, the contractor used its novel "spreader box." The mixture is dumped from trucks into the box from where it is shoveled to a hopper that keeps it pliant as it is dropped into the ditch. The box sides control the spread and make the initial levelling preparatory to final rolling. The mix is put on in two layers, the lower one 30 in. wide and the upper one 27 in. wide, and each layer is rolled.

★ Making the final trenching pass with a drop-section on the grader blade

•

Dr. John Monteath Joins C. A. A.

Dr. Monteath was recently transferred from his position as Agronomist with the Engineering Division of Military Construction, Corps of Engineers, to that of Agronomist with CAA's Technical Development Division. This transfer brings to CAA a man familiar with the army's experience in the stabilization of airports by the use of grasses and fertilizers. It is considered to be sound governmental policy to now make Dr. Monteath's skill available in the development of our commercial airports.

★ Kaw Paving Company's spreading operation, done speedily with a special box attached to one side of a bulldozer apron

★ An interesting test set-up in the frost investigation program being conducted at Selfridge Field by the engineering and construction division of the Detroit District Engineer Office. Purpose is to measure deflection in the concrete under various soil conditions as a result of certain applied pressures. Two large water-filled tanks, supported by 10-in. I-beams on each end of a 30-ft. long I-beam, are used as the resisting force to apply a 100,000 lb. pressure on the corner of the 10-in. concrete apron slab by means of a 50-ton hydraulic jack set on a 24-in. diam. steel plate

Airfield Load Tests

in Progress at Selfridge Field

THE advent of airplanes having wheel loadings many times greater than the heaviest truck wheel loadings on today's modern highways, has created serious problems in the design and construction of airport pavements. Under a nation-wide War Department program being administered by the Corps of Engineers, the Detroit District Engineer Office has for several months been conducting tests at Selfridge Field, Michigan, to determine the effect of frost conditions on the load-carrying capacity of these pavements. Data resulting from these tests and field investigations will undoubtedly be used to improve and develop fundamental design standards.

Traffic load tests were made with special equipment designed by the Corps of Engineers which duplicated the loading of heavy bombers. Wheel loads up to 60,000 lb. on a dual wheel assembly were used. During tests which were started on March 2 and completed on March 25, this equipment was pulled over one area 15 times daily to simulate the capacity operation of a B-29 on a runway, and was pulled over another area 45 times daily to simulate the capacity operation of a B-29 on a taxiway.

See accompanying photos and statements for some of the best details.

The frost investigations not only involved traffic load tests but re-

★ Close-up indicating position of three deflection gauges (one in rear not visible) and pressure gauge for 100,000 lb. static load test using a 24-in. diameter steel plate on corner of 10-in. concrete slab

★ Special test rig pulled by a Super "C" Tournapull, loaded to 60,000 lb. Dual 56-in. B-29 test tires mounted to carry entire load. Photo shows machine being used to resist jack pressure for section modulus test on base material with 30-in. diameter steel plate

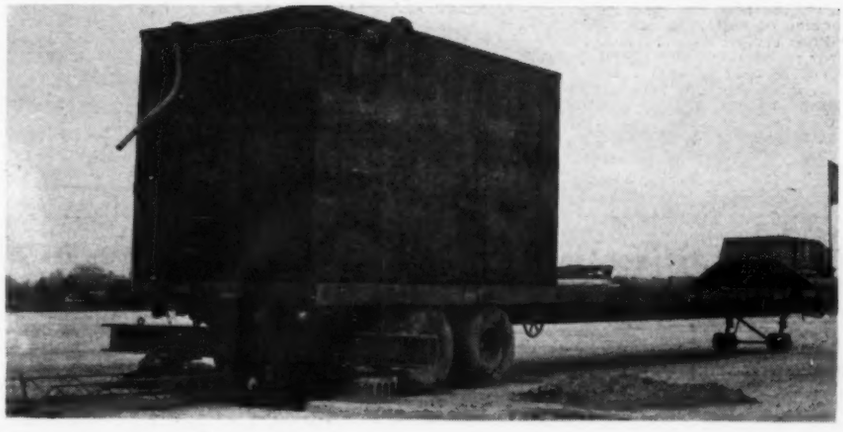
quired detailed research and tests of the many factors that affect the pavement strengths, such as ground water elevations, foundation material, and the amount of heave in the pavement due to the formation of ice lenses in the underlying soil during frost periods.

In carrying out these tests, Army Engineers constructed eight thermometer wells below the pavement, with depths varying from one to eight feet, to record subsurface temperatures. Also, numerous test pits were excavated through the 10-in. pavement to the depth of the water table to obtain moisture and density samples of the soil and to follow the frost level down into the subgrade and back to the surface again. Numerous photographs were taken to study the ice lenses in the subgrade soil. Theoretically, if all the thicknesses of the minute horizontal ice lenses should be added up, the total thickness would equal the amount of heave in the pavement due to frost, which this year reached a depth of 2.9 ft. below the surface of the pavement.

Another test which the Detroit Engineer District made consisted of taking periodic readings of twenty-two ¾ in. galvanized iron pipe wells for ground water elevations and elevation of water in the base material under the pavement in an effort to determine subsurface drainage conditions. Since Selfridge Field is completely tiled, it was possible to isolate sections and determine the subsurface flow for a certain area by measuring the flow into certain manholes and catchbasins.

Information compiled by the Detroit Engineer District from these investigations is expected to be utilized in the proposed revision to the Airfield Pavement Design and Airfield Drainage Design sections of the Engineering Manuals prepared by the Chief of Engineers, Washington, D. C.

★ Test pit in traffic test lane after 1080 coverages of a 60,000 lb. load. Moistures, densities and soil profiles were taken in pit



★ 40,000-lb. section modulus test on base material using a 5,000-gal. water tank mounted on a 20-ton Air Corps trailer

RECENT BIDS

Airport at Boston

Project: Logan Airport, East Boston, Mass. Letting agency, Massachusetts department of public works.

Improvement: Construction of surfaces on runways, taxiways, service roads, etc.

Bids received January 29, 1946. Engineer's estimate, $2,386,012.

Contractor's Bids Received:

(1) DeMatteo Const. Co., Quincy, Mass. (Award) $2,302,680.75
(2) Perini & Sons, Inc., Framingham, Mass. 2,307,680.00
(3) Stewart & Son Co., Watertown, Mass. 2,717,069.50
(4) Barletta Co., Roslindale, Mass. 2,818,303.00
(5) Rotondi & Sons, Stoneham, Mass. 3,178,358.00

Bid Items, Three Lowest Bidders

		(1)	(2)	(3)
Cl. A rock exca.	1,000 cu. yd.	$ 1.00	$ .70	$ 3.00
Unclassified exca.	468,500 cu. yd.	.63	.70	.85
Top soil exc. and stacked	9,400 cu. yd.	.40	.40	.40
Trench exca.	9,000 cu. yd.	1.40	1.50	2.00
Cl. B rock exca.	25 cu. yd.	1.40	5.00	8.00
Ordinary borrow	21,700 cu. yd.	.85	.70	1.73
Gravel borrow	1,063,000 cu. yd.	1.52	1.50	1.73
Compacting gravel borrow	375,000 sq. yd.	.05	.01	.07
Sand borrow	1,100 cu. yd.	2.25	3.00	2.50
Governors Island and Apple Island borrow	226,000 cu. yd.	.70	.70	.85
Fine grad., roll and finish.	206,000 sq. yd.	.05	.05	.08
Cr. stone for base crse.	2,800 tons	2.90	3.00	3.00
Calcium chloride for sur. tr.	20,000 lb.	.03	.03	.03
Bit. (tar) for surf. tr.	66,000 gal.	.105	.12	.12
Bit. (asph.) for surf. tr.	21,000 gal.	.10	.10	.10
Bit. (asph. seal) for surf. tr.	14,000 gal.	.10	.10	.10
Crushed st. for mac. surf.	2,900 tons	3.00	3.10	3.00
Bit. for mac. surf.	33,100 gal.	.10	.10	.10
¾" Peastone for double pen. mac. surf.	700 tons	3.75	3.50	3.50
Bit. (2nd pen. and seal) for mac. surf.	19,300 gal.	.12	.13	.12
Cl. I bit. conc. pave. Type I-1	2,000 tons	7.50	8.00	7.50
Field st. mas. in cem. mortar	3 cu. yd.	20.00	17.00	20.00
Rock fill	1,000 cu. yd.	5.00	5.00	5.00
Gutter inlets	10 each	85.00	70.00	75.00
Catch basin, manhole or leaching basin adj. to line and/or grade	1 each	50.00	50.00	50.00
Catch basin or manhole, change in type	1 each	150.00	170.00	100.00
Frame and grate or frame and cover furn. and inst.	1 each	50.00	50.00	50.00
18" r. c. pipe (extra strength)	50 lin. ft.	4.75	3.50	3.00
24" r. c. pipe (extra strength)	2,800 lin. ft.	5.60	4.50	5.00
36" r. c. pipe (extra strength)	50 lin. ft.	11.00	7.50	8.00
6" asph. ctd. corr. metal pipe	7,400 lin. ft.	.95	1.00	1.00
8" asph. ctd. corr. metal pipe	800 lin. ft.	1.30	1.50	1.75
12" asph. ctd. corr. metal pipe	100 lin. ft.	1.75	2.00	2.50
24" asbestos bonded asph. ctd. corr. metal pipe, 12 g.	2,200 lin. ft.	5.65	5.75	5.50
24" asbestos bonded asph. ctd. corr. metal pipe, 14 g.	1,700 lin. ft.	4.28	4.00	4.25
6" sub-drains	38,400 lin. ft.	.80	1.00	1.00
Lumber platform	45 MFBM	180.00	150.00	150.00
Individual posts	515 each	4.95	5.00	5.00
Curbing rem. and reset	50 lin. ft.	.75	1.00	2.00
Curbing remov. and stacked	10 lin. ft.	.60	.50	1.00
Timber bulkhead rem.	10 sq. yd.	5.00	6.00	6.00
Timber bulkhead rem.	110 lin. ft.	2.00	2.50	6.00
Labor for test boring	1,000 hours	1.45	1.75	1.50
Service of watering cart, laying dust	70 days	25.00	25.00	40.00
Two radio receiving stations	1 L.S.	2,500.00	3,500.00	2,000.00
Portable field office	1 L.S.	1,000.00	1,000.00	1,000.00
Sub-drain lamp holes, covers	130 each	12.00	15.00	25.00
Rolling bit. tr. gravel surf.	1 week	216.00	200.00	500.00
Extra depth exca. (2'-6')	4,000 cu. yd.	.75	1.00	1.50
Extra depth exca. (6'-10')	2,000 cu. yd.	.75	1.40	1.50
Temporary culvert	1 L.S.	9,800.00	9,500.00	10,000.00
Brick walks rem. and stacked	50 sq. yd.	1.25	1.00	.75
		$2,302,680.75	$2,307,680.00	$2,717,069.50

Kentucky Accidents up 50%

Increase in Kentucky highway traffic as indicated by automatic recorders is bringing an increase in highway accidents, according to J. Stephen Watkins, state highway commissioner. The first three months of 1946 showed an average traffic increase of 5% over 1941, while accidents soared to a new high of more than 50% over 1941 during the same months.

State-wide Speed-Zoning in Ohio

A state-wide speed-zoning program to help cut the high traffic fatality rate on Ohio's highways was announced today by State Highway Director Perry T. Ford. The department's Division of Traffic and Safety is making surveys and studies of dangerous road sections throughout the state, and as the surveys are completed, speed zones will be established.

These zones will be maintained until dangerous conditions can be remedied. The director has the power, under Section 6307-21 of the General Code, to reduce the statutory speed limit of 50 mph. to a "reasonable and safe speed upon any portion of a state highway whenever he has determined by a traffic and engineering investigation that the statutory prima facie speed limit of 50 mph. is unreasonable or unsafe for conditions." Roadside signs warning motorists of the reduced speed limits will be erected, the director said, and traffic lines and markings will be painted on the pavement to guide drivers.

Similar speed zones have been established in Ohio from time to time, "as guinea pigs," but this is the first time that the Ohio highway department has launched a determined and sustained campaign to speed-zone every dangerous section of state highway in the state.

English Highway Design Terminology

The English refer to their equivalent of our traffic circles as "roundabouts." They also call a grade separation a "flyover" and a "verge" corresponds to an American grassed road shoulder. English traffic is "platooned" by breaking up the stream of traffic using a street or highway by means of traffic signals. An English road is "splayed" when an extra lane is added at an intersection to increase its traffic capacity.

Mail Inserted Card for Equipment Data

Again this issue of Roads and Streets carries descriptions of many new labor-saving efficiency devices and latest material developments. See our Postwar Parade beginning on page —, for which a numbered reply card has been inserted to help you request data on items that interest you.

You get all 3—with the model A-D

POWER 75 Diesel horsepower—more than enough for the toughest kind of work. 2-cycle engine efficiency and economy.

TRACTION 21,500 lbs. total weight... with 15,660 lbs. concentrated on the four rear Tandem wheels, that drive together... as a unit!

CLEARANCE 22-inch front axle clearance allows material to flow freely to moldboard—no hanging-up on windrow, no wasting h.p. pushing a dead load.

Plus a full range of blade positions and leaning front wheels to handle all types of grading with ease.

Plus simplified operation—easier steering and control, electric instruments, electric brakes, full operator comfort.

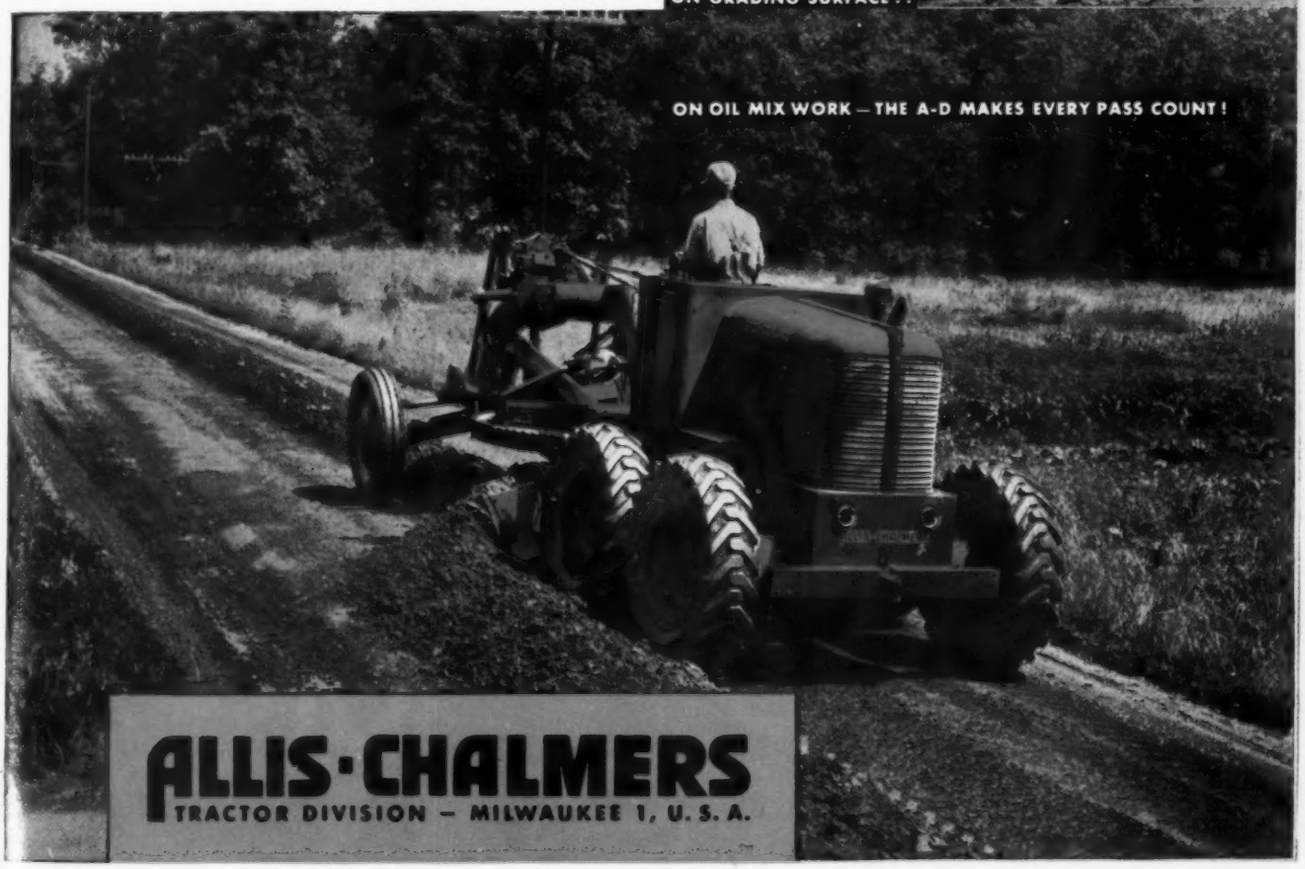
Plus a larger capacity, longer life, easier-to-operate clutch... gears that automatically lock in place... a tubular frame that resists all twists and strains.

Together these Model A-D features mean more work done, more accurately, at lower cost . . . a better job on every job!

ON SLOPING . .

ON DITCHING . .

ON GRADING SURFACE . .



ON OIL MIX WORK—THE A-D MAKES EVERY PASS COUNT!

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

New York Airport Authority

IN OUR opinion, the action taken by the New York state legislature —in creating the authority which will take over the construction and carry on the operation and maintenance of Idlewild and LaGuardia airports as well as any other airports built within the city limits—is one of the most intelligent steps taken so far in the airport end of the aviation industry. It would seem desirable, however, to have gone a step further and to have taken in the entire metropolitan area, including Newark. The feasibility of the broader scope is shown by the excellent work of Port authority. It is believed that a more coordinated plan for the area would have resulted thereby.

With the hand of the city's famous park commissioner, Robert Moses, now also city construction coordinator, behind the scenes, we predict results similar to those which have made New York's parkway so outstanding. The experience of this authority will, no doubt, serve as a guide to many other large cities throughout the nation. Smaller communities can probably find a number of features which will work for them in both financing and operation. Airports are too complex a facility to be subject to whims of changing political groups and their management calls for the most efficient kind of personnel and business methods.

In keeping with the intent of the legislation, Mayor William O'Dwyer has appointed to the authority three men of unquestioned ability and integrity. The authority consists of Harry Guggenheim, chairman; Laurence S. Rockefeller, and General Jimmy Doolittle. The term of appointment of the members is arranged so that a new appointment will be made to the authority every two years.

The act authorizes the authority to make leases and contracts, and execute instruments; construct buildings, facilities and maintain and operate the projects; accept loans, grants or contributions from the state or federal government; and fix and collect rentals, fees and other charges. The authority is empowered to issue up to $250,000,000 worth of bonds without involving the city's tax structure or debt limit. The bonds are to be amortized from the earnings of the airports involved. It will be of interest to learn the extent of the confidence the investing public has in the ability of airports to pay their own way.

Plans and estimates are at present being prepared for consideration by the authority and the organization which it will assemble. It is expected that construction work required to complete the airport to a usable condition will proceed late this year.

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(*Continued from page 92*)

Extreme care should be exercised in laying the original grade where this sloping strata exists, in order that the ditch line will not cut into and leave a stratum of the rock or shale unsupported.

The surface of all slides should be kept as smooth as possible in order that surface water will readily drain from the surface instead of soaking down through cracks and fissures to aggravate the slide. This smoothening of the surface of the slides may be done by hand, with bulldozers or with graders, depending upon the steepness of the slope of the surface of the slide.

MR. CONTRACTOR

It is your responsibility to control the air content of the concrete.

Read the new "specs" on the amount of air that must be entrained, and then use Darex AEA as a gauge-water addition. You can meet the specifications and keep the control of the air content in your hands. It's the only way you can compensate for changes occurring in the field.

Darex AEA costs only a few cents per yard. It is safe, harmless. Comes ready to use. Darex Air Entraining Concretes save you time and labor because they are plastic, workable, reduce segregation and bleeding, speed up finishing, give durable concrete. — DEWEY AND ALMY CHEMICAL COMPANY, Cambridge 40, Massachusetts.

Use Darex AEA with Confidence

Measuring meters available

Simple metering devices for Darex AEA are available. Write for details.

Maintenance Costs Vary Greatly According to Committee Report

THE following interesting data, condensed in the Convention Number of the Highway Research Board's "Abstracts," is from a progress report of the Board's committee on highway maintenance costs and operating methods.

In an effort to arrive at comparative costs, field maintenance engineers of the Public Roads Administration were asked to secure from State highway departments such data for individual maintenance operations on portland cement concrete pavements as were readily available. A description was also requested of the materials and practices on the operations studied. This progress report furnishes the results of the survey and also an analysis of costs on several other maintenance operations. The conclusions are:

1. Maintenance expenditures in the United States of six-tenths of a billion dollars per year on highways, roads and streets are of such magnitude as to emphasize the need of revaluing present maintenance practices, materials and equipment used to insure the highest degree of economy and efficiency.

2. Comparisons are now hampered by a lack of uniformity in units of measure in maintenance cost keeping.

3. Comparing costs on a lineal foot basis of filling joints and cracks in concrete pavements develops the range of costs as from ¼ to ⅝ cents per lineal foot. There is an indication that with increase in age beyond ten years the costs per mile increase quite noticeably in the maintenance of joints and cracks. There are also indications that machine methods are quite markedly more economical than hand operations, possibly permitting a saving of 50%.

4. The patching of concrete pavements with bituminous materials costs from $0.25 to $1 per square yard. There are no satisfactory data as to the life of the patches.

5. The cost of patching concrete with concrete ranges from $4 to $6.70 per square yard. Work performed by State forces costs from 80 to 90% of the cost by contract. There are indications that the cost per square yard of concrete patch decreases with the increase in size of the patch.

6. The cost of drilling holes in concrete pavement for mud-jacking ranges from $0.07 to $0.23 per hole. Information on the cost of slurry, including pumping under the pavement is meager; probably it is in the neighborhood of $10 per cubic yard. Information on the cost of pumping asphaltic mixtures under the pavement is also meager but is probably around $0.12 per gallon.

7. The reports on shoulder maintenance are not conclusive but costs vary with the type and the width of shoulders. As an illustration, one state reports the cost of maintenance of 8-ft. turf shoulders as approximately $94 per mile. This includes $19 for mowing, $50 for machining or rolling high places, and $25 for patching and seeding. The maintenance of crushed rock shoulders seems to be generally the most economical ranging from $25 to $70 per mile.

8. Cleaning and shaping of drainage ditches, as would be expected, is reported to be more economical by machine methods than by hand methods. Useful comparisons can be made only when data are available on maintenance of ditches of similar design and in similar soils.

(*Continued on Page* 122)

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★ LOWER FIRST COST: When you buy a Wood Roadmixer you buy only one piece of equipment.

★ LOWER MAINTENANCE COST: Pulled and powered by a standard crawler tractor.

★ TWO-MAN OPERATED: One man on tractor, one man on Roadmixer for average job.

★ HANDLES ALL MATERIALS: Road oils, emulsions, asphalt, soil-cement, etc.

★ MAXIMUM PRODUCTION: Wood Roadmixer produces in excess of 250 tons an hour of ready-to-spread mix.

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THE WORLD'S LEADING TRAVEL PLANT

Low-cost native or local materials located at or near the site of the job can be used for paving with a Wood Roadmixer. This saving in labor and equipment often cuts the original cost of a job as much as two-thirds under other methods.

The Wood Roadmixer is the world's pioneer and leading travel plant method of rapid, low-cost pavement construction. For literature and prices, see your local Wood Roadmixer dealer or write direct. 2-A

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Lift the cab from any UNIT crane or shovel. You'll find the following exclusive features not found in any other comparable machine:

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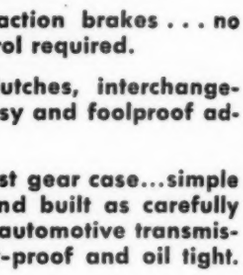
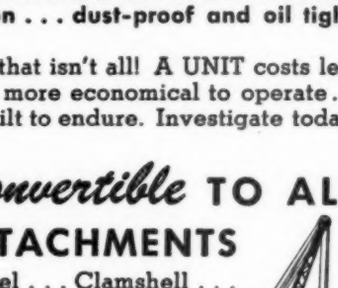


UNIT 1020 Clamshell



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Nevada building 24-ft. plant-mix

Access Road to Davis Dam

Aerial reconnaissance speeds project needed for construction and maintenance of the Reclamation Bureau's huge new irrigation and flood control project; isolated location on Colorado River

WESTBOOK and Pope of Sacramento, Calif. have several incentives to complete their $422,000 contract for grading and paving the highway connecting Davis Dam and U. S. Highway 95 at the earliest possible date. The 16 miles of new highway starts about 20 miles south of Searchlight, Nev., and runs easterly across a rugged stretch of desert and mountains until it reaches the Colorado River just below the dam. Temperatures of 140 degrees and no shade will be the rule starting early in June. The Utah Construction Co., which has the contract for the construction of Davis Dam, needs this new highway to bring in most of their equipment and supplies. Another factor appears to be a race between the states of Nevada and Arizona to see which can provide the most convenient route by which the laborers on the dam can get away from the project long enough to spend their surplus pay. O. P. Pope, partner in the road building firm, and just back from the Seabees, is on the job himself and has tentatively picked a day about the middle of July as the time when he can have the work finished.

Aerial Reconnaissance Expedited Plans

The sudden ending of the war allowed the dam project, a prewar contract which had been cancelled, to come to life rather unexpectedly. The resulting situation required the state highway and P. R. A. engineers to take fast action in getting the access highway under contract. While the use of airplanes in mapping and determining alignment of highways is not as yet standard Nevada highway practice, J. M. Murphy, Division Engineer at Las Vegas, used his personal airplane and a speed-graphic camera to very good advantage on the location work. The serial photographs, taken at low altitude, saved a great deal of time in the field and allowed the location party to complete its work in the mountainous terrain with a minimum amount of lost motion.

Mining Claims Spring Up

Every town within a hundred miles of the dam is booming on the basis of the construction payroll. Searchlight is outdoing the gold rush days and new businesses are springing up at every strategic spot. To insure the highway having enough ground for its right-of-way, the government has withdrawn a 200 ft. wide strip of the public domain. The wisdom of this action is attested by the number of posts one sees in the ground, each with a tin can nailed on the side, marking mining claims which have recently been staked at likely locations along the route. To a casual observer, most of the claims seem to fall on sites quite suitable for filling stations or tourist camps. Such assessment work as has been done apparently has not turned up any startling quantity of gold, but anything is possible in that fabulous country.

$77,000,000 Dam

Construction of Davis dam, 64 miles downstream from Boulder dam, was officially started April 22 with the setting off of one blast of 24,000 lb. of TNT. This dam, the fourth structure which the Bureau of Reclamation will use to harness the once rampaging Colorado river, is another controlling link in the system to supply southern California, Nevada and Arizona with electric power and irrigation. Capable of storing 2,000,000 acre-feet of water and generating 250,000 kilowatts of power, the dam will cost $77,000,000 and require five years to complete.

Camp Centrally Located

Westbook and Pope have elected to contract for feeding and sheltering their construction personnel. Brittingham Commissary, Inc., of Los Angeles, which performs similar services for various movie studios, has set up a camp near the center of the project. The location chosen takes advantage of an adequate source of water supply at an elevation which allows gravity flow to the camp. The contractor's offices and maintenance facilities are located on the camp site.

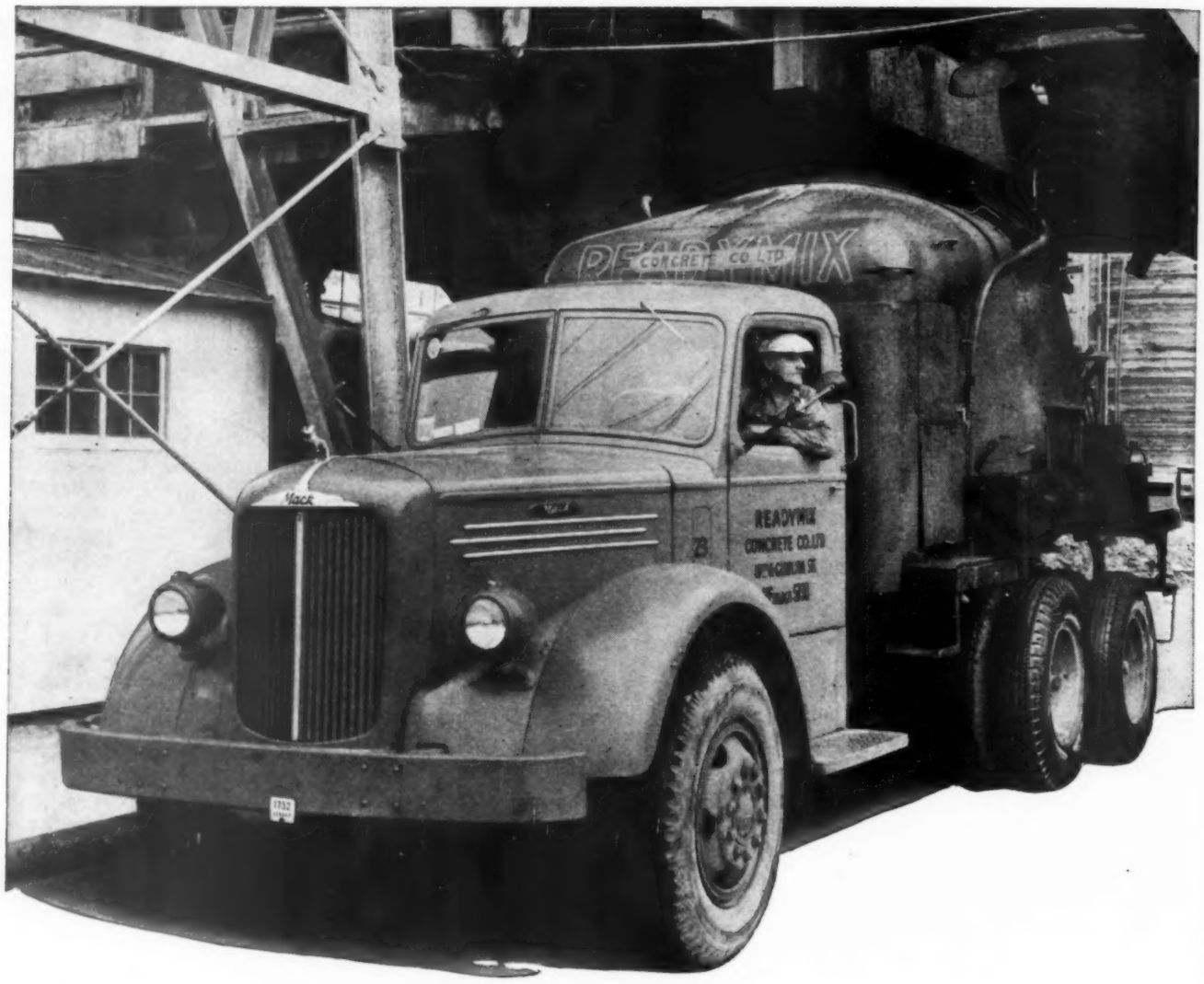
Unclassified Excavation

The contractor has a price of 90 cts. per cu. yd. for so-called class "B" excavation which varies from shallow earth cuts to as much as 66 ft. of solid rock.

Part of Secondary System

The project is part of the Nevada secondary highway system and is federally financed to the extent of

★ Self-powered scrapers work well in desert soil



Why does READYMIX CONCRETE CO., LTD. use Mack Trucks?

For the answer, look at some of the jobs Readymix and Macks have handled together.

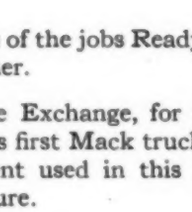
San Francisco's Furniture Exchange, for example. Readymix in 1935 bought its first Mack trucks, to deliver the mountain of cement used in this 10-story, 1,000,000-square-foot structure.

Or look at the Hunter's Point Drydocks, one of Readymix's great wartime achievements. Mack trucks hauled 140,000 yards of cement for that job, averaging 7,000 yards a week continuously without a single breakdown.

Such performance, multiplied over 11 years, has kept Readymix solidly sold on Macks. And the extra large capacity of these trucks—six yards as compared with the usual four—has sped deliveries of the Company's product.

Macks could probably help you haul *your* products faster, more economically. A Mack representative will be glad to talk it over with you.

Mack
TRUCKS
FOR EVERY PURPOSE



Performance Counts!

Mack Trucks, Inc., Empire State Building, New York 1, N. Y.; Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

★ Commencing drilling operations at west end of rock section

82.67%. Some short sections have the maximum allowable grade of 6% while a number of other sections have grades in the neighborhood of 5%. A minimum radius of 1,000 ft. pertains to all curves. The pavement will consist of 2 in. travel-plant-mix surface course laid on selected material placed during grading operations. The pavement will be 24 ft. wide and will have no shoulders. The state of Nevada has found from its experience that it is less expensive to pave the shoulders than it is to maintain them otherwise. This condition is accounted for by the prevalence of excellent base course material together with the impossibility of holding the sandy soil in place with such vegetation as grows in the desert. The completed highway will connect with Arizona highways by way of a roadway across the top of Davis Dam. A temporary wooden bridge spans the Colorado for construction purposes. D. H. Hays is the resident engineer for the state of Nevada.

•

40-Mile Speed Limit for New England—The Committee on Street and Highway Safety of the New England Governors' Conference has recommended a uniform 40-mile per hour prime speed limit for the six New England states.

Blasting Caps

— Never Let Up on Safety Vigilance

Handling of electric blasting caps and delay electric blasting caps is a job calling for every worker to be on his toes. They are also a matter for frequent administrative check-up in the contractor's or highway department's home office

The following statements are included with every cap shipment by E. I. du Pont de Nemours & Co. We believe they should be reread by everyone concerned with highway construction.

DON'TS For Blasting Caps

1. DON'T purchase, possess, store, transport, handle, or use blasting caps except in strict accordance with organizational, local, state, and federal regulations.

2. DON'T store blasting caps anywhere except in a magazine which is clean, dry, well-ventilated, properly located, substantially constructed, and securely locked.

3. DON'T store blasting caps in the same box, container, or magazine with other explosives.

4. DON'T leave blasting caps lying around where children can get them.

5. DON'T smoke or have matches, open lights, or other fire or flame in or near a magazine, or have them nearby when handling or using blasting caps.

6. DON'T drop, throw, or slide packages of blasting caps or handle them roughly in any manner.

7. DON'T open wooden cases of blasting caps with metallic tools. Use a wooden wedge and wooden, rubber or fiber mallet.

8. DON'T store or leave packages of blasting caps which have been opened without replacing the cover.

9. DON'T leave blasting caps exposed to the direct rays of the sun.

10. DON'T attempt to reclaim or use blasting caps that have been water-soaked even if they have been dried out. Consult the manufacturer.

11. DON'T carry blasting caps in pockets of clothing.

12. DON'T insert a wire, or nail, or any other implement into the open end of a blasting cap to remove it from a box.

13. DON'T strike, tamper with, or attempt to remove or investigate the contents of a blasting cap.

14. DON'T make up primers of explosives in a magazine or near excessive quantities of explosives.

15. DON'T connect blasting caps to Primacord except by the methods recommended by the manufacturer.

16. DON'T store fuse near radiators, steam pipes, boilers, or stoves.

17. DON'T handle fuse carelessly in cold weather. If possible it should be warmed slightly before using to avoid cracking the waterproofing coat.

18. DON'T use short fuse. Cut fuse long enough to extend beyond the collar of the hole and to allow time to

(*Continued on page* 110)

Specification for

LONG TRUCK LIFE
LOW OPERATING COST

1. Go to your International Branch or Truck Dealer and say, "These are my loads. These are my routes. I want a truck that is strong enough and big enough to do my work."

2. Accept the recommendation you get. Here's why: The International Truck Line is complete. It includes a truck of the right type and carrying capacity for every job. International Branches and Dealers can recommend the right trucks without prejudice.

3. Set up a program of regular International service. The work is done by skilled mechanics, using special International equipment and factory-standard International parts. The service is supplied by International Dealers everywhere and by the nation's largest company-owned truck-service organization—International Branches.

Today's International Trucks are the best ever built. They represent more than 40 years of truck engineering and manufacturing experience. This engineering and manufacturing has long been so outstanding that in the last 15 years more heavy-duty Internationals have been purchased for commercial use than any other make.

So buy International—service International—and don't "under truck." That's the specification for long truck life and low operating cost.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Listen to "Harvest of Stars" Every Sunday, 2 p.m. Eastern Time! NBC Network

INTERNATIONAL

INTERNATIONAL *Trucks*

Keep up Your Truck "PM"!

Wartime lessons in thoroughness must not be forgotten. Trucks are still on the hard-to-get list, and systematic Preventive Maintenance and careful operation of trucks will pay off—in fewer repairs, and tie-ups and lower job costs

AS WE ramble about visiting highway contractors and their jobs—and some road and street departments, too—we see trucks, trucks everywhere and let George take care of them. George may be an earnest, well meaning fellow, but his boss doesn't always really *know* how well he's taking care of the truck assigned to him. If George happens to be an overworked shop foreman a master mechanic, he is more likely to be keeping a systematic eye on truck servicing, but he still needs the chief behind him.

The main thing isn't knowing what's to be done, but knowing that it's *being* done by the men on the job, and that's a management function.

So—the following reprinted suggestions are addressed to Mr. Contractor himself. They are taken with permission from Mack Trucks, Inc., a company which has been a leader in training and encouraging truck owners to take thorough care of their machines.

Preventive Maintenance

In order to economically operate heavy duty haulage equipment, it is necessary to periodically perform the following service and inspection operations. These various operations fall into several different classifications as to their required frequency. In order to insure this periodic care, it is highly desirable that this work be

DAILY (24-HOUR) SERVICE

Truck No._____ Date_____

Group	Item	Mechanic
Chassis	Grease alemite fittings _____	
	Grease cups. Turn down two (2) notches. Refill when empty _____	
	Check for loose bolts, rivets or broken parts _____	
Clutch	Check pedal travel. Adjust if less than ½ in. travel _____	
Body	Hoist cylinders. Alemite fittings upper and lower _____	
	Check condition of hoist cylinders _____	
	Lubricate hoist drive universal joints with gear oil _____	
	Check retractor chains and springs _____	
	Note condition of plates and angles in body _____	
Brakes	Blow off condensation _____	
	Check for air leaks and proper operation of valves, etc. _____	
Electrical	Check all lights and generator charging rate _____	
Engine	Check lubricating oil level _____	
	Check lubricating oil pressure _____	
	Check radiator. Fill to level 1½ in. from top _____	
	Check for oil and water leaks _____	
	Check for fuel oil leaks _____	
	Check fan belts. Adjust if necessary _____	
	Check radiator shutters _____	
	Check fuel and air gages _____	
Tires	Check tire pressures _____	
	Tighten rim lug nuts _____	
Steering	Inspect all connections for looseness _____	
	Check for leaks in hydraulic system _____	
	Check steering pump belt. Adjust if necessary _____	
Chains	Check looseness. Adjust if necessary _____	

SEASONAL SERVICE

Truck No._____ Date_____

Group	Item	Mechanic
Engine	Remove oil pan and clean pump screen _____	
	Check condition of main and connecting rod bearings _____	
	Remove head, clean carbon, examine valves and note general condition of rings, pistons and cylinders _____	
Brakes	Inspect lining blocks, drums and cams _____	
	Renew worn parts that will not last until next inspection _____	
	Inspect slack adjusters for wear _____	
	Repack with lime base grease _____	
Transmission and Differential	Drain, clean and inspect. Check adjustment of bearings and gear. Refill to proper level with seasonal gear oil _____	
Cooling System	Drain, clean and flush. Renew hoses and gaskets where necessary. Use rust inhibitor when refilling _____	
Wheelbearings	Clean, inspect, change grease and adjust _____	
Steering	Check and adjust wheel alignment _____	
Tubes and Connections	Blow out, inspect and test all tubes, connections and flexible lines _____	
Hoist Reservoir	Drain oil. Flush and refill with clean oil _____	
Steering Reservoir	Drain oil. Flush and refill with clean oil _____	

FORM No. 1

DRIVER'S DAILY TRUCK REPORT

Haulage Truck No._____ Shift _____

Date_____ Account No. _____

Item	Amount	Remarks
Speedometer Reading—Start		
Speedometer Reading—Finish		
Daily Mileage		
No. of Worked Hours		
Oil Pressure—Idling		
Oil Pressure—Full Speed		
Number of Trips		
Number of Gallons Fuel		
Number Quarts Oil		
Water in Radiator		

General Remarks:—

Haulage Truck Operator_____

FORM No. 2

DAILY TIME CHECK

No. and Name_____ Date_____

Occupation_____ Acc't. No._____

Give Full Description of Work Performed	Hours	Rate	Amount

Time Started _____

Time Finished _____

Foreman _____

Timekeeper _____

done on a well-established pre-determined schedule and not on a "catch-as-catch-can" basis.

In offering the following suggested schedule, it is realized that various operators will find it necessary because of local conditions in their particular operation, to depart to some extent from the exact schedule indi-

FORM No. 4

TIRE CHANGES

Truck No._____ Mileage_____ Date_____

TIRE PUT ON	TIRE TAKEN OFF
Serial No._____	Serial No._____
Brand No._____	Brand No._____
Make Tire_____	Make Tire_____
Front_____	Front_____
Rear_____	Rear_____
Remarks_____	Remarks_____
_____	_____
_____	_____

Signed _____

NOTE: It has been found good practice to brand your own number on the side wall of each tire in easily read numbers. The numbers molded on to the tires by the manufacturer are often obliterated after a short period of service.

FORM No. 5

TIRE RECORD CARD

Serial No._____ Make_____ Brand No._____

Truck No.	Put On		Taken Off		Total Mileage	W.O. No.	Date	Labor	Supplies	Cost Per Mile
	Date	Mileage	Date	Mileage						

FORM No. 6

DAILY FUEL AND LUBE OIL CONSUMPTION RECORD

Truck No._____ Month of_____

Date	Daily Operating Hours	Total Hours To Date	Gals. of Fuel	Quarts of Oil	Miles per Day	Mileage to Date	Gals. Trans. Oil	Pounds of Grease
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Total								

FORM No. 7

MONTHLY HAULAGE TRUCK REPORT

Period_____ Date_____

Truck No.	Operating Hours			Fuel Oil Gals.	Mileage			Crankcase Oil Gals.	Transmission Oil	Pounds Grease
	First of Month	End of Month	Total Hours		First of Month	End of Month	Total Miles			
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
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23										
24										
25										
26										

cated herein. Because of differences in work-shift hours and total number of shifts per day or per week, it is quite probable that minor variations in the length of the 80, 160, 320 and 640 hour periods indicated will be found necessary. It is suggested, however, that these periods be maintained within not more than a plus or

FORM No. 8

TRUCK DELAY SUMMARY SHEET

Truck No._____ For Month of_____

Date	1 to 9 Shift			9 to 5 Shift			5 to 1 Shift			Total Time		
	In	Out	Repairs	In	Out	Repairs	In	Out	Repairs	In	Out	Spare
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
Total												
Remarks												

FORM No. 9

TRUCK DELAY DAILY SUMMARY SHEET

Date_____ Shift_____

Equip. No.	Time In			Time Out			Repair Time	Spare Time	Field Time	Remarks
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
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24										
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26										
27										
28										
29										
30										
31										

minus 10% variation. Primarily the suggested service schedule and record keeping procedure indicated herewith are intended merely as a suitable guide from which each individual operator can readily establish a schedule and procedure most suited to his individual needs.

Suggested Preventive Maintenance Set-Up

Daily Service

See chart. This group includes all items that should be covered daily, such as greasing, lube oil level inspection, tire inspection and many others.

80-Hour Service

This group covers the daily service items plus changing the engine lube oil, lube oil filters and checking spark plug gaps.

160-Hour Service

This group covers the 80-hour service items plus checking transmission and jackshaft oil levels, lube oil changes, clutch adjustments, etc.

320-Hour Service

Covers those items in the 160-hour service plus some additional items such as checking brakes, steering etc.

640-Hour Service

Covers items in the 320-hour service plus some that might be called semi-overhaul items, such as cleaning and flushing the engine, tightening engine bolts, removing and cleaning injectors, etc.

Seasonal Service

Covers such items as summer and winter changes in engine oil, transmission and differential oil, and wheelbearing grease. Also covers brake lining and drum inspection and other long period operations.

As noted, all of the above services, except daily, are based on periods of actual operating hours or in other words, the number of hours that the unit has been working in the field.

Preventive Maintenance Records

To successfully maintain a preventive maintenance schedule in the garage and in order to furnish complete and comprehensive reports on the trucking operation from which suitable costs may be obtained, it is necessary that those in immediate charge of the trucking operation maintain accurate records. It has been proved that the value of such records fully justifies the establishment and maintenance of the necessary routine required. While the physical form of the record is unimportant and can be set up to fit in most readily with the operator's general bookkeeping scheme, the following suggestions will serve to indicate the type of information necessary. The forms attached and the information they indicate have been proved successful by several years of actual use.

Form No. 1: Driver's Daily Report

On this form the driver records truck operating information which is not immediately available to the garage, such as oil pressures, engine temperatures and general comments on the operation of the unit in the field.

Form No. 2: Daily Time Check

This is a small form which each employee fills out. The mechanic, for example, describes on this slip the work performed and the time required. The office clerk fills in the rate, account number and cost. One man who has done several jobs during the day fills out a separate slip for each job.

Form No. 3: Work Order

When some work for the garage must be done outside, such as in the blacksmith shop or machine shop, the garage foreman or superintendent should cover it with a work order. This will avoid verbal instructions and possible misunderstandings and will serve as a permanent record.

Form No. 4: Tire Change Sheet

Whenever a tire must be replaced on a truck for any reason, the make,

FORM No. 10

MONTHLY WORK REPORT

Period _____ Date _____

Truck No.	Time out of Service	Engine	Clutch Fl. Dr.	Transmission	Differential	Chassis	Power Take-off Unit	Cab & Body	Hoist	Tires	Servicing	Time Out No Parts	Accident Repairs
1.													
2													
3													
4													
5													
6													
7													
8													
9													
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22													
23													
24													
25													

FORM No. 11

SERVICE REFERENCE BOARD

Truck Numbers

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1														
2						160								
3									320					
4												640		
5														
6														
7														
8														
9														
10														
11														
12														
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14														
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30														
31														

brand number, serial number, truck number, truck mileage and location should be recorded on this slip for the tire removed as well as for the tire installed. The filled form is forwarded to the garage office for further reference.

Form No. 5: Tire Record Card

Every tire should have a permanent record card on which is marked the information listed on the tire change sheet as well as the cost information taken from the daily time check sheet. In this way a complete and instantaneous record is available during the life of said tire.

Form No. 6: Daily Fuel and Lube Oil Consumption Record

The fuel, lube oil, transmission oil mileage, and operating hours per day information shown on this form is obtained from the Driver's Daily Report (Form No. 1). This form carries along day by day for the month for one truck and the monthly totals are used for summary purposes.

Form No. 7: Monthly Haulage Truck Report

The total number of operating hours, gallons of fuel, gallons of lube oil, gallons of transmission oil, miles, etc., per month per truck, is obtained from the Daily Fuel and Lube Oil Consumption Record and is recorded on this general summary sheet covering all the trucks. From this information one can derive the average fuel consumption in miles per gallon or gallons per hour and other similar information.

Form No. 8: Truck Delay Daily Summary Sheet

The shop foreman records the time on this form whenever a truck enters or leaves the shop, and also makes a note as to whether the unit is returning to the field or is available as a spare unit.

Form No. 9: Truck Delay Summary Sheet

This form, covering one truck for one month, accounts for the hours the truck spends in the garage, out in the field, and working as a spare unit. This information is obtained from the Truck Delay Daily Summary sheet. (Form No. 8.)

Form No. 10: Monthly Work Report

This report covers the distribution of the total repair time for all trucks. The information is obtained from both the Daily Time Check sheets and the Truck Delay Summary sheet. This form is handy as a ready reference at any time to determine whether chronic trouble has developed in any particular part or parts of the unit.

Form No. 11: Service Reference Board

As a handy reference for determining the proper date for servicing the trucks in accordance with our suggested maintenance schedule, it is suggested that a large board (as large as feasible) on which is shown the date when the indicated service is due for the particular truck, be mounted on the garage wall in a spot where it can be easily seen by the garage personnel and truck bosses.

TRANSITS and LEVELS

HEADQUARTERS for REPAIRS – any make

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalogue RS-95 of Engineering Instruments, Engineering Field Equipment and Drafting Room Supplies.

WARREN-KNIGHT CO.
Mfrs. of Sterling Transits & Levels
136 N. 12th St., Philadelphia 7, Pa.

OTC
MAINTENANCE TOOLS

RUGGED TOOLS for TOUGH JOBS

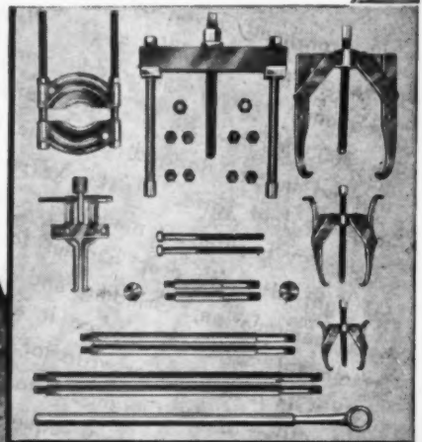
DEPENDABLE heavy duty tools for pulling and installing bearings, gears, sleeves, wheels, shafts and other close-fitting parts. Made of high alloy, drop forged, heat-treated steels, precision machined—strong, easy to handle, portable, SAFE to use, FAST-working! Approved by Hyatt, M-R-C, New Departure, SKF, Timken, and by Tractor Manufacturers.

OTC PULLERS and Attachments, BOX WRENCHES and other tools in sizes to handle practically every maintenance job.

FACTORY APPROVED CATERPILLAR SET
Essential service equipment for all CATERPILLAR Tractors; also used on other tractors and on road machinery. Other sets available to meet your needs.

Write for OTC Maintenance Bulletin showing many time-saving OTC uses.

OWATONNA TOOL CO.
319 Cedar St., Owatonna, Minn.

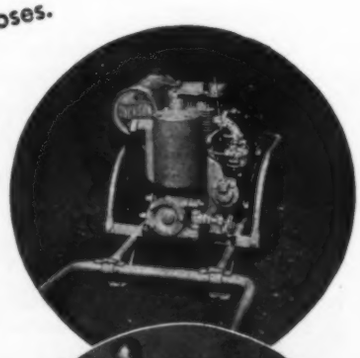


The JACKSON Hydraulic CONCRETE VIBRATOR

for those 24 HOUR DAYS OF CONTINUOUS SERVICE

Thoroughly proved the most dependable and efficient vibrator in its class on practically every major wartime project. Now newly streamlined for even greater convenience and efficiency, the JACKSON Model HS-A1 is by long odds the best buy for general, all-around concrete construction purposes.

Vibrator head driven by hydraulic motor. Standard head 2¾" x 21". Vibratory frequency instantly adjustable from 3000 to 7000 V.P.M. All moving parts submerged in oil. Rugged, neoprene lined hose 34 feet long. Husky Wisconsin engine. Wheelbarrow mounting balanced for light lift, with drop handles for easy hose manipulation. Grinding and drilling attachments available. See it at your JACKSON distributor or write for further details. Other JACKSON models to ideally suit every concrete vibratory requirement.



ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

Referring to sample Form No. 11 attached, the figures 160, 320 and 640 represent the type of service due on the date shown. For example a 160-hour service is shown due for Truck No. 6 on the 2nd; a 320-hour service due for Truck No. 9 on the 3rd; a 640-hour service due for Truck No. 12 on the 4th; etc. These figures are painted on tabs which can be moved about the board freely and hung on hooks.

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Kean-Wise, Inc., New Contracting Firm in Pennsylvania

Edward Kean and Martin W. Wise have formed Kean-Wise, Inc., a new contracting firm in the heavy construction field of western Pennsylvania with offices at Valencia, Pa. Mr. Kean was a contractor in the same area before accepting a commission with the Seabees in 1942 and serving with the 53rd Naval Construction Battalion in the Pacific area. Mr. Wise was formerly vice president and general superintendent of the Harrison Construction Company, Pittsburgh, and is well known to many construction men in the east and southeast.

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(*Continued from page* 103)

retire safely from the blast. Never use less than two feet.

19. DON'T cut fuse until you are ready to insert it into a blasting cap. Cut off an inch or two to insure a dry end.

20. DON'T crimp blasting caps to fuse with a knife or with the teeth. Use a standard cap crimper and make sure that the cap is securely fastened to the fuse.

21. DON'T cut fuse on a slant. Cut it square across with a clean, sharp blade. Seat the fuse lightly against the cap charge and avoid twisting after it is in place.

22. DON'T use fuse and blasting caps in wet work without having a thoroughly waterproof joint between the fuse and cap.

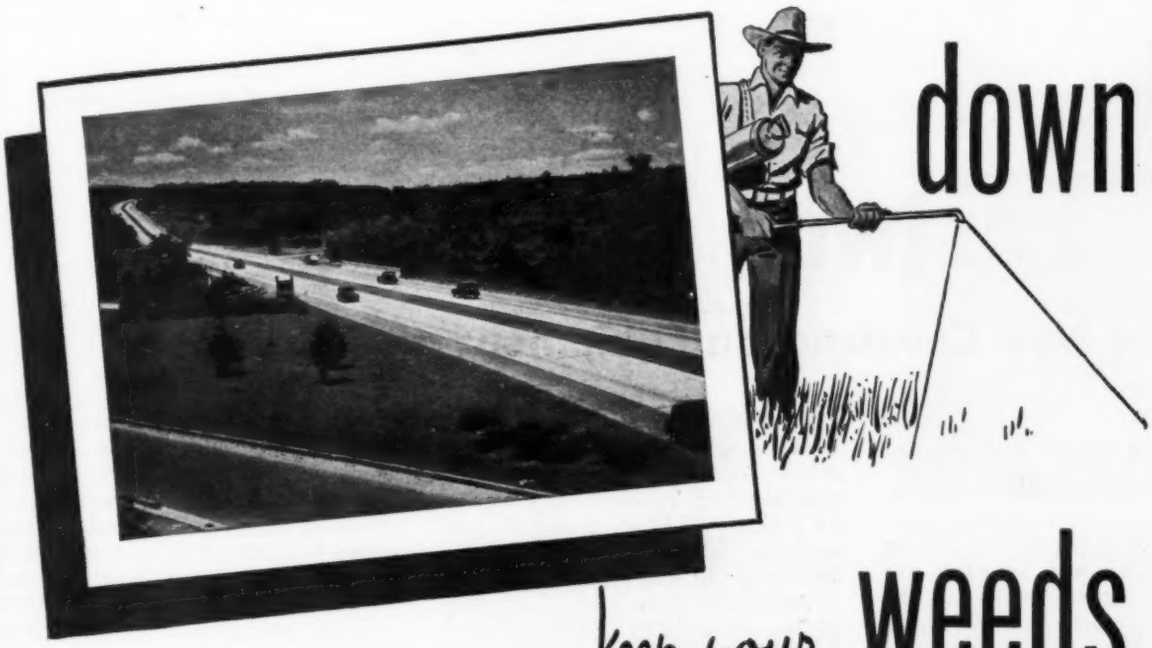
23. DON'T hold a primer cartridge in the hand when lighting fuse.

24. DON'T light fuse in any bore hole until the bore holes contain sufficient stemming to protect explosives from sparks from the end spit of fuse or flying match head.

25. DON'T try to light fuse with burning paper, other inflammable refuse, or improvised torches.

26. DON'T attempt to investigate a misfire too soon. Follow all applicable rules and regulations, or if no rules are in effect, wait at least an hour.

Keep your maintenance cost down!



... keep your weeds down!

SPRAY YOUR WEEDS AWAY!

Big jobs or small, 2-4 Dow Weed Killer gets rid of weeds wherever they are—easily, safely, *chemically!* But it's on the big jobs like yours, where you may have *acres* of weed problems, that this economical method makes the biggest difference in dollars and cents.

ALL you have to do is spray the weed tops according to directions; 2-4 Dow Weed Killer does the rest! It kills the weeds without harm to common grasses —does away with cost-consuming hand digging and hoeing. This tested product—you've read about it—is available in both powder and liquid forms.

If you want to get rid of *grasses and weeds,* use another Dow time-saving product—Dow Contact Herbicide. This new vegetation control agent kills top growth—especially valuable wherever mowing is impractical.

WITH **2-4 Dow** *Weed Killer*

Look Over These Advantages of 2-4 Dow

- √ **Harmless to ordinary grasses**
- √ **Easier and safer to handle**
- √ **Noncorrosive to spraying equipment**

See Your Dealer or Write Direct

AGRICULTURAL CHEMICAL DIVISION
THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

New York · Boston · Philadelphia · Washington
Cleveland · Detroit · Chicago · St. Louis
Houston · San Francisco · Los Angeles · Seattle

DOW

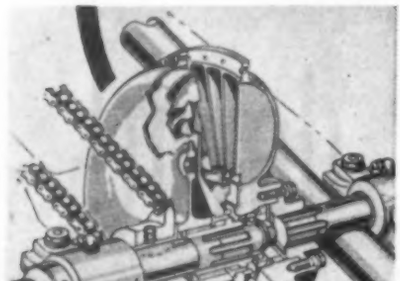
CHEMICALS INDISPENSABLE
TO INDUSTRY AND AGRICULTURE

Postwar Parade

of New Construction Equipment and Materials

New Fluid Drive Coupling

1. A fluid drive coupling for use on cranes, hoists, winches, conveyor systems and other equipment where smooth starting and stopping are necessary is in production by the Toolcraft Manufacturing Co., Huntington Park, Calif. This hydraulic oil coupling, which operates on the well-known Vulcan-Sinclair principle, eliminates the necessity for both a transmission and differential mechanism. The principle of operation is simple—the unit being self-contained and consisting of three basic parts. It can be installed directly on the shaft of any engine or electric motor—it engages and disengages without human control and slippage is eliminated.



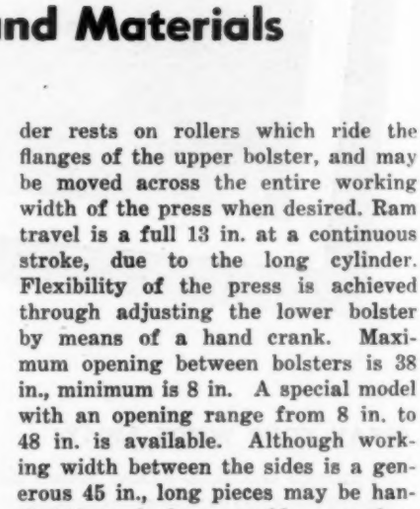
Firebaugh Fluid Drive Coupling

Two New Petroleum Products

2. Development of a new product called Stano-Purge for cleaning crankcases and lubrication systems of engines, and another new product named Stano-Vim for purging fuel-burning systems of gasoline engines has been announced by Standard Oil Company of Indiana. Neither product is generally available at service stations yet, but both will be soon. Stano-Purge is designed to remove loose crankcase sludge and clean oil screens and passages. Stano-Vim's function is to remove varnish, gum, and carbon deposits from valve stems, manifold and intake valve parts, remove combustion chamber deposits and clean fouled spark plugs. Both new products have high solvency for resins and gums formed by deterioration of motor oil and low volatility with high flash point—which will minimize fire hazards. Their aromatic solvents content is more than 90 per cent. They have the pronounced odor characteristic of naphthalenes.

New 60-Ton Shop Press

3. A new shop press of 60 tons capacity has been announced by Rodgers Hydraulic, Inc., of Minneapolis, Minn., makers of hydraulic presses of many stypes. Features claimed for the press, called the Rodgers "sixty," are fast operation, ruggedness, versatility, and large capacity for work size. Power is supplied by a Rodgers 2-speed hydraulic hand pump which, in high speed, moves the ram 2½ in. per pump stroke, giving up to 2,000 lb. pressure in fast travel. Lever on the pump may be quickly flipped for high pressure operation. The hydraulic cylinder rests on rollers which ride the flanges of the upper bolster, and may be moved across the entire working width of the press when desired. Ram travel is a full 13 in. at a continuous stroke, due to the long cylinder. Flexibility of the press is achieved through adjusting the lower bolster by means of a hand crank. Maximum opening between bolsters is 38 in., minimum is 8 in. A special model with an opening range from 8 in. to 48 in. is available. Although working width between the sides is a generous 45 in., long pieces may be handled through the open sides any place above the globe valve and pump. The hydraulic pump, globe valve and gauge in tons and pounds, are located on the lower right side of the press for operating convenience. A machined and matched pair of V-blocks is furnished as standard equipment. Special attachments for ring gear riveting and for aligning and centering shafts, rod, etc., are available, as well as an end support stand (ad-



The Rodgers "Sixty" Press

Mail Inserted Card

for data on equipment described on these pages

justable) for handling long material. It is claimed that a great variety of general shop operations are easily performed by Rodgers "Sixty," such as: pressing, straightening, shearing, bending, clamping, riveting, broaching, and assembly work.

New Spreading Pot

4. A new pot for spreading chips, sand, gravel, slag, salt, calcium chloride and cinders, that gives far better results than shoveling in securing an even spread and providing a neater and more economical job, has been added to the line of Aeroil Products Co., West New York, N. J. The pot has a big shovel opening for easy filling and a comfortable carrying handle. The opening is adjustable, and combined with the big back handle is stated to give perfect flow control in pouring solids. The pot has a diameter of 10 in., a height of 15 in., and a capacity of 4½ gal. or ½ cu. ft. of dry materials. The shipping weight is 7 lb.

New Water System for Truck Mixers

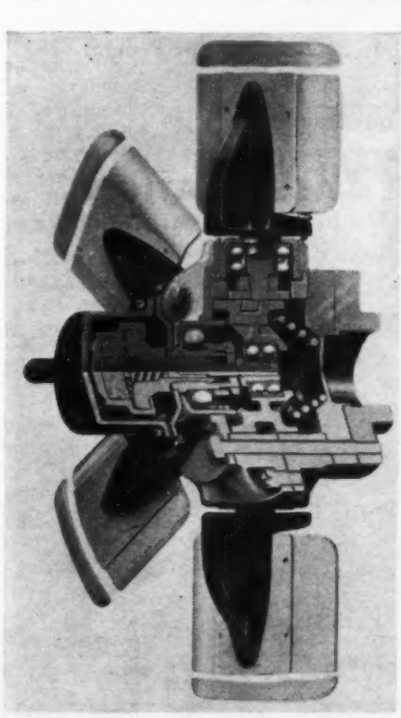
5. One of the revolutionary features claimed for the 1946 model truck mixer of the Jaeger Machine Co., Columbus, O., is a water system which insures fast, uniform distribution of the specified mix-water to the batch under all operating conditions. This is accomplished by the development of a positively clog-proof water jet. Pressure for the water line is supplied by a standard Jaeger "Sure Prime" pump. Use of positive pump pressure permits eliminating the awkward overhead tank required with gravity operation. Mix and flush

Jaeger 1946 Model Truck Mixer

water tanks are now mounted solidly on the main frame, protected from distorting stresses which affect accuracy of measurement, and permitting the entire front end of the truck mixer to be enclosed for weather protection and winter warmth.

New Adapter Design for Thermo-Control Fan

6. A front operating adapter design of the thermal power element in the Evans thermo-control fan has been released by Evans engineers for production by the Thermo-Aire Division of Evans Products Co., Detroit, Mich. This new model has been engineered to simplify installation of the thermo-control fan in existing engine mounts when necessary clearances are available. To install the new model, it is only necessary to remove the old fan from the fan hub and remount the thermo-control fan with the correct mounting flange to fit the hub. The thermo-control fan, which is designated for heavy duty equipment, is a



Cutaway View of Evans Thermo-Control Fan

variable pitch self-adjusting fan operated by a built-in thermal power element. Adjusting itself to changes in engine and ambient temperature, the fan is claimed to maintain near constant engine operating temperature, increasing horsepower output, reducing fuel, lubricating oil and maintenance costs and eliminating nearly all formation of sludge deposits in engine and lubricating oil. The fan is manufactured in four, six and eight blade models.

New Truck Body for Handling Concrete

7. A high discharge truck body, named the Dumpcrete, designed especially for transporting air-entrained concrete from central mixing plant to job site, has been announced by Maxon Construction Co., Inc., Dayton, O., The Dumpcrete is built of all-welded high tensile steel with important weight-saving features. Novel design permits discharge of concrete as high as 6 ft. 3 in. from ground level. A specially designed and arranged hydraulic hoisting mechanism provides a dumping angle of 90 de-

Model 4C Mounted on Standard 5-Ton Truck Showing Dumping Angle

grees. This dumping angle, plus the fact that all corners are rounded and interior welds ground smooth, make possible a clean and fast discharge. An adjustable baffle, deflector plates, and an inverted center keel provides a discharge similar to that of a bottom-dump bucket. Standard equipment also includes a specially designed gate, a hopper for directional discharge, and two sections of chute, one 5 ft. 6 in. in length and the other 5 ft. 0 in. The gate may be easily removed for hauling other materials. The Dumpcrete is being produced in two models, 2C and 4C, with respective rated concrete capacities of 2 and 4 cu. yd. Struck volumes are 3.5 and 6.25 yd. Height of discharge is 4 ft. 3 in. for Model 2C and 6 ft. 3 in. for Model 4C when mounted on standard truck chassis.

Two Operator Gas Drive Welder

8. The Hobart Brothers Co., Troy, O., has developed a two-operator gasoline engine driven arc welder by placing two of their 300 ampere generators on a common shaft, and supplied with separate excitation from a common exciter. This double unit is directly connected to an 8 cylinder Chrysler industrial engine. Two operators can work independently of each other, since the engine is governed to maintain constant speed for all loads. A paralleling switch is also provided to turn the unit effectively into a single operator 600 ampere unit.

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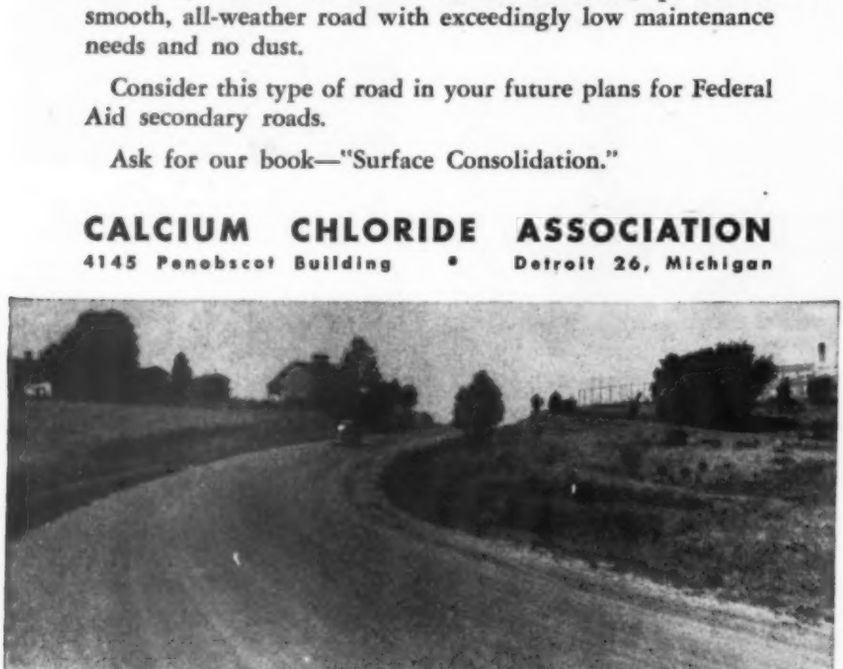
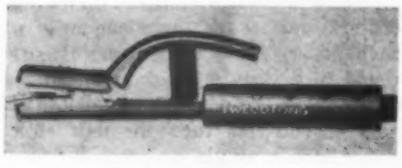


More Miles of Better Roads—
CALCIUM CHLORIDE
Consolidation

New Electrode Holders

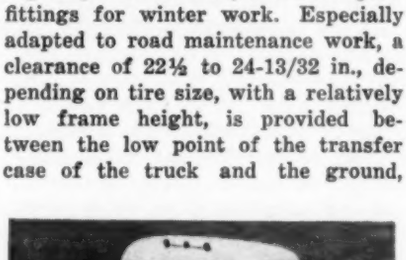
9. A complete new line of manual arc welding electrode holders to be known as "Twecotong" has been announced by Tweco Products Co., Wichita, Kan. The new line includes full-insulated and semi-insulated models. The full insulated models are known as No. A-14, 300 ampere, ¼ in. electrode capacity; No. A-38, 500 ampere, ⅜ in. electrode capacity. The semi-insulated models are known as No. B-14, 300 ampere, ¼ in. electrode capacity; No. B-38, 500 ampere, ⅜ in. electrode capacity. "Twecotong" is a conventional tong type holder; however, it features almost indestructible molded-laminated glass cloth Bakelite insulation keyed to the holder casting. Tensioning spring firmly seats on fibre upset washers and is protected from spatter by nonbinding Neoprene tubing. Well ventilated fibre handle, together with good cable connection, assures a cool running holder. All parts are replaceable.



Twecotong Electrode

New Truck

10. A new FWD model HG all purpose highway construction and maintenance truck is now in mass production by the Four Wheel Drive Auto Co., Clintonville, Wis. A 4-ton capacity truck, the HG is designed to mount such optional equipment as body, hoist and underbody blade for general highway maintenance, and snow plow fittings for winter work. Especially adapted to road maintenance work, a clearance of 22½ to 24-13/32 in., depending on tire size, with a relatively low frame height, is provided between the low point of the transfer case of the truck and the ground, assuring ample room for mounting underbody scrapers. The truck is enengineered to grade roads at 5 to 15 miles per hour, and maintain roads up to 20 miles per hour. The FWD five speed transmission used in the model HG is of exceptionally rugged design, and provides constant mesh, helical gears in 3rd, 4th and 5th speeds. Power is transmitted to the front and rear drive shaft through the shock absorbing silent chain drive and the fully compensating center differential which may be locked from the cab of the truck for tough going. Axles of advanced engineering design have full-floating axle shafts, relieved of all load carrying strains. Ring gears and pinions, which are interchangeable between front and rear axles, are of spiral bevel design, perfectly matched for extra heavy-duty service and smooth, quiet operation. Front wheels steer and drive through the "lifetime" steering and driving knuckles of improved ball and socket design. The 6-cylinder engine develops 98 B.H.P. and has a torque of 270 lb.



New 1946 Model HG Truck

INCREASE YOUR PROFITS *with combined superiority*

Perfection Platform Stake Bodies and Hydraulic Booster Hoists reach their *highest efficiency* when operating TOGETHER. As a *combined* unit they offer you unequalled ease of installation, performance, and service thru such features as . . . rugged, composite steel and wood bodies with adjustable sills . . . application of power at a point near center of load . . . over-all distribution of lift under entire load . . . anti-sway, double, compound type lift arms . . . extra-powerful, smooth, fast-action hoist.

Perfection Hydraulic Booster Hoists are also adaptable to any make of platform body having formed steel channel or wood longitudinal sills. Likewise, Perfection Platform Stake Bodies are adaptable for use with other makes of platform booster hoists. On such installations, PERFECTION units in themselves will meet the most exacting standards.

For all makes and models of trucks. Write for literature and names of nearest Distributors.

THE PERFECTION STEEL BODY CO.
Galion, Ohio

Perfection Platform Stake Bodies are also mountable as stationary units.

PERFECTION
TRUCK BODIES AND HOISTS

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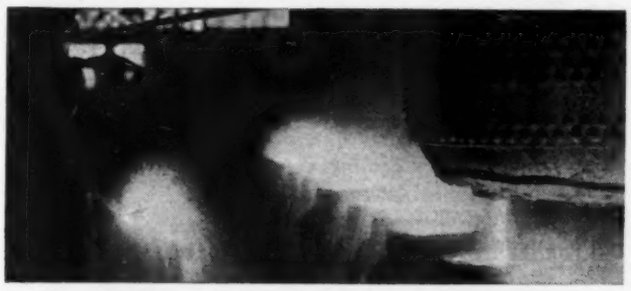
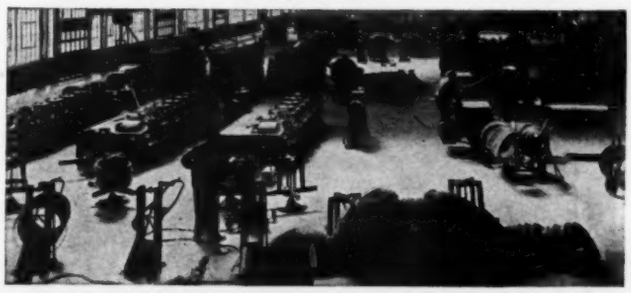
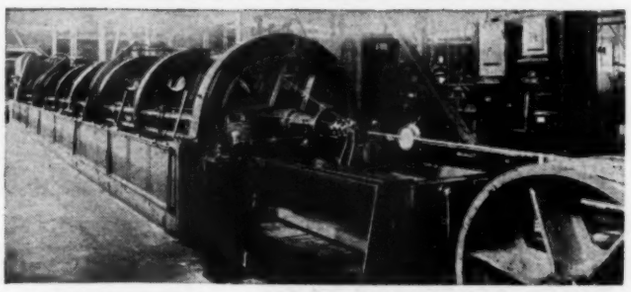


THROUGH PROCESSING THE WIRE—



TO FABRICATING THE WIRE ROPE—



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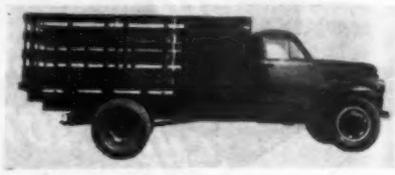
New Rock Drills

11. Three new models of pneumatic rock drills have been added to the Thor line of Independent Pneumatic Tool Co., Chicago, Ill. Model 28 is the lightest weight Thor sinker drill and is designed for light to medium-light work for drilling and block holing. Its light weight facilitates handling on scaffolds. The Model 33 Thor sinker is a light weight drill designed for medium-light work in quarries and mines, for public utility service or for general use in industrial plants. The Model 139 is a light weight auger drill designed for all classes of auger work in conglomerate, cemented gravel, talc, clay, slate, shale and other loose or broken formations, where drilling is most profitably done by the auger method. Its light weight permits easy handling from a man's shoulder or hip.

Two New Truck Models

12. Two new heavy duty truck models have been announced by the Studebaker Export Corporation, South Bend, Ind. The two models, M-17 and M-16, are available in 128 in., 152 in. and 195 in. wheelbases adaptable to a wide range of body mountings from 9 ft. stake bodies to 20 ft. school bus bodies. The M-17 has such standard equipment as fish-

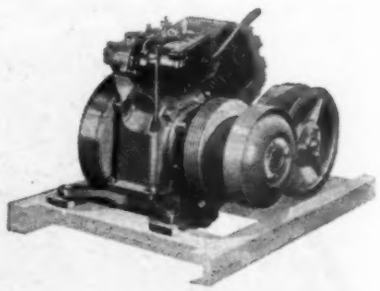


M-17 with 152-in. Wheelbase Length

plated frame, 10-ply 8.25x20 single front and dual rear tires, heavy duty front, rear and auxiliary rear springs and a two-speed double reduction rear axle with vacuum power shift. The standard heavy duty M-16 has a channel frame, more than 8 in. deep, with six to eight cross members. A four-speed transmission is standard as is the heavy duty rear axle.

Automatic Driving Unit

13. A completely automatic driving unit in the low horsepower field in which drive ratios are controlled by the driven unit and clutch arrangement is controlled by engine speed, has been announced by Salsbury Motors, Inc., Los Angeles, Calif. The Salsbury automatic transmission consists of a variable diameter driven



Salsbury Power Package

pulley, and a V-belt. These units form a co-ordinated assembly which gives automatic, infinitely variable ratios over a 4 to 1 range. This transmission is the heart of the Salsbury power package, the engine of which is a Salsbury Model 600. This is a single-cylinder, 4-cycle, air-cooled type, developing 6.5 hp. at 3200 r.p.m., occupies but 1⅛ cu. ft. and weighs 56 lb.

BITUVIA *Plant Mix*

For
- RESURFACING OLD CONCRETE ROADS
- PATCHING CONCRETE AND BITUMINOUS ROADS
- WEARING SURFACES OF ROADS, AIRPORTS, DRIVEWAYS, PARKING AREAS

● BITUVIA Plant Mix is a flexible product, with a number of uses. It is especially useful for early-in-the-year patching, as it sets up uniformly, can be rolled or tamped shortly after laying, and requires a minimum amount of application labor.

The illustration above shows a road built entirely of REILLY BITUVIA, with a BITUVIA stabilized base, BITUVIA plant mix wearing surface, and a seal coat of BITUVIA RT-10. This road, built in 1943 to serve a large war plant, has carried unusually heavy traffic from the day it was completed. Over the three-year period it has required no expenditure for maintenance and today shows little evidence of wear.

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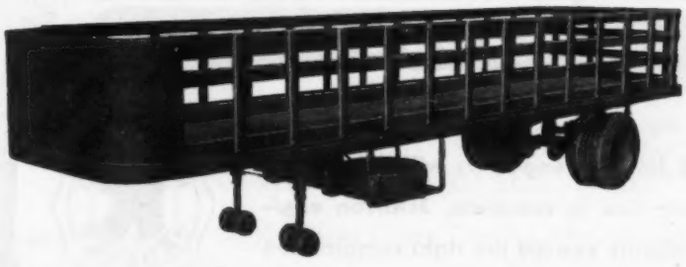

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MANUFACTURERS' LITERATURE

Electric Tool Equipment

14. The complete line of Syntron electric tool equipment is illustrated and described in a 40-page catalog issued by Syntron Co., Homer City, Pa. The equipment includes portable electric hammers, drills, screwdrivers, nut runners, grinders, sanders, and semi-portable hack saws.

Bulldozers

15. The new "Caterpillar" No. 8A and No. 7A (angling type) bulldozers are illustrated and described in a broadside just published by Caterpillar Tractor Co., Peoria, Ill. The bulldozers, a new addition to the "Caterpillar" earthmoving "family," designed and built for exclusive use with "Catepillar" Diesel D8 and D7 tractors, are pictured in actual operations in the publication. Design features are highlighted and specifications are given.

Jacks

16. A new 64-page Catalog No. 45 of Simplex lever screw and hydraulic jacks has been published by Templeton, Kenly & Co., Chicago, Ill. Hundreds of jacks of conventional and special types, in sizes from 3- to 100-ton capacity, pictured and described with specifications: dimensions, capacities, weights, etc. Feature pages show jacks in various applications. Two convenient indexes, showing jacks by types and numbers respectively, make this catalog extremely easy to use.

Building Codes

17. The present housing crisis points to the necessity of lowering costs so that adequate homes can be brought within the reach of more and more American families. One important road is the modernization of building codes, it is pointed out by the National Committee on Housing, Inc., New York, N. Y., in announcing the publication of its latest study "Your Building Code." Written by Miles L. Colean, housing and community planning authority, the study is in popular form to encourage the widest possible interest and understanding. It explains what the local building code is, how it works, and what citizens can do to make it more effective and helpful to the community. Chapters discuss such subjects as "What Is the Matter With Building Codes?", "Six Building Code Problems," "How Codes May Be Improved" and "What Can Be Done Now."

Corrugated Steel Piling

18. Complete specifications for Caine corr-plate steel piling are given in a catalog of Caine Steel Co., Chicago, Ill. Technical data and tables are included and examples are cited of how the piling has been used on many projects. Advantages of standard and interlock piling are explained.

Tar and Asphalt Pots

19. A bulletin issued by Aeroil Products Co., West New York, N. J., illustrates and describes its line of pots, buckets and dippers for handling and application of bituminous materials. Each of the pots illustrated was designed for a special purpose, including sheet pouring, line pouring, crack filling, pipe coating, etc.

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You analyze the market, determine the volume you want, and Johnson engineers will do the rest.

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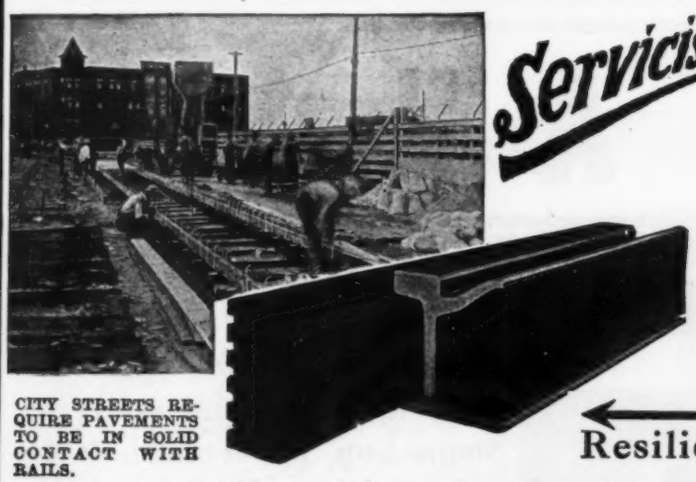

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Through many long years of successful service our resilient Rail Filler has more than proved its inherent value to both city and Ry. company. Waterproofing spaces between rails and pavement have prevented infiltration, freezing, cracking and costly deterioration; also eliminating problems of vibration, noise, contraction, expansion and costly re-alignments. Street Railway Systems are possibly the largest users of Servicised Rail Filler, but it is also frequently used where interstate or interurban railroads run in contact with city pavements for distances of a few blocks to several miles.

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Vibrating Screens

20. A new 16-page bulletin on its vibrating screens has been published by Pioneer Engineering Works, Minneapolis, Minn. Fully illustrated, and with descriptive text, this new bulletin presents the complete line of Pioneer perfectly balanced vibrating screens suitable for commercial or stationary operations. Details of construction, along with specifications on types and sizes are included.

Bituminous Supply Tanks

21. Supply tanks ranging in capacity from 1,250 to 4,000 gal. are the subject of a broadside issued by Littleford Bros., Inc., Cincinnati, O. Illustrations of the various models and details are shown. Illustrations and brief descriptions also are included of the "Spray Master" pressure distributor, "Tankar" steam heater, and Trail-O distributor.

Paving Products

22. A new 16-page Keystone paving products catalog has been issued by Keystone Asphalt Products Co., Chicago, Ill. The new catalog graphically lists and illustrates the company's complete line of paving joints, sealing compounds, concrete curing compounds and sewer joint compounds. Engineering designs and specifications are featured throughout the two color folder.

Flame Guns

23. Flame guns for destroying weeds are featured in a 24-page catalog issued by Hauck Manufacturing Co., Brooklyn, N. Y. The guns which produce a "flat flame" of 2,000° F. are used for many purposes, including the splitting of rocks and boulders. Two new models, the heavy duty Hercules flame gun on wheels and the double Hercules flame gun on wheels, are illustrated and described.

Emergency Jack

24. The Simplex No. 310A general purpose jack is covered in a bulletin just issued by Templeton, Kenly & Co., Chicago, Ill. This 15-ton jack is the latest and most advanced development of the original tilting emergency jack, with such improvements as a greater base area, an easy hook lock, a more convenient carrying handle, greater overload capacity, and a longer and wider machine-corrugated toe lift.

Bottom-dump Hauling Unit

25. M-R-S Manufacturing Co., Jackson, Miss., has issued an informative new catalog on its bottom-dump hauling unit, the Mississippi Wagon. The catalog describes various models offered and gives complete specifications for each. Special emphasis is placed on the dual-purpose nature of the Mississippi Wagon, all models being designed for use both on and off the highway.

Motor Grader

26. The "Caterpillar" Diesel No. 12 motor grader is featured in a new folder published by Caterpillar Tractor Co., Peoria, Ill. The publication offers a brief, but thorough, description and profuse illustrations of the construction and production attributes of the motor grader, designed and built by "Caterpillar." Specifications are included.

Brake Linings, Clutch Facings

27. Data and illustrations of all Raybestos products, including listings of brake linings, clutch facings and fan belts are given in the new 1946 catalog of Raybestos Division of Raybestos-Manhattan, Inc., Bridgeport,

TROJAN

UTILITY SPEED PATROL

Rugged, thrifty and powerful! Stepped-up power behind this welterweight makes it possible to do heavy jobs at low cost. Spring grading and winter snow removal are made easy when a Trojan is on the job.

Write for literature and specifications.

CONTRACTORS MACHINERY CO., INC.
Dept. RS 62 Batavia, N. Y.

See Your International Industrial Distributor.

Conn. Extending index tabs, designating quick reference sections of the Raybestos products, makes the new catalog a real source of expedient information and easy to use. Latest information concerning the new Raybestos "Key-Lok" brake block, and Ray-Metl, the unique automotive and industrial clutch facing, is also in this issue.

Explosives

28. Over 100 types and grades of commercial explosives are listed in a catalog of Atlas Powder Co., Wilmington, Del. Descriptions and properties of various types are given. Included also is the complete line of blasting caps, Rockmaster detonators and blasting accessories. Valuable information on electric blasting and its Rockmaster system is contained in the catalog.

Ditching With Dynamite

29. Methods of ditching with dynamite are fully explained in a 32-page booklet of E. I. du Pont de Nemours & Co., Wilmington, Del. Numerous charts and diagrams show the methods of loading and ditching. The tools required are illustrated and described.

(*Continued from page* 88)

ducement to remove the current wave of opposition to highway improvements in built-up areas."

Mr. Noble used lantern slides to illustrate the design and difficulties involved in New Jersey's projected state-wide system of freeways and parkways—estimated to cost $150,000,000. A portion of the 8-lane freeways was described as dual-dual highway.

Airfield Drainage Studies

Despite the excellent progress made in studies of flow of water in saturated base courses of airport pavement as reported by Dr. Arthur Casagrande, associate professor of civil engineering at Harvard, and William L. Shannon, Boston office of U. S. E. D., it seemed to be the consensus that finding all the answers to pavement drainage will require very much more extensive research.

"Even simple considerations," Dr. Casagrande said, "lead to the conclusion that the time required to effect a given amount of drainage of a saturated base course, will increase with the square of the width between the drain pipes; that is, in general with the square of the width of the pavement. For example, if for a given base course material and thickness 24 hours would be required to effect 50% drainage of a 20-ft. wide road pavement, then a runway of a width of 200 ft. would require 10 squared or 100 times longer; that is 100 days to effect the same degree of drainage. Obviously, it is important to design the base course so that the period during which the bearing capacity of the base will be substantially reduced be shortened from 100 days to only a few days."

Emphasizing that the symposium, in which highway engineers also are keenly interested, is in the nature of a progress report, Dr. Casagrande made public his formula for the benefit of fellow engineers, and Mr. Shannon described the models used in checking them and showed photographs of the results obtained.

Dr. Casagrande reported it "possible to determine the progress of drainage as a function of time by means of a mathematical approach," but again warned that "a rigorous mathematical approach" cannot solve entirely such problems of non-steady flow, particularly in the face of addition of another variable, the time.

Participating in the symposium, by discussing the papers presented by Dr. Casagrande and Mr. Shannon, were G. W. McAlpin, associate soils engineer, New York State Department of Public Works, Albany, and two Washington, D. C. engineers, Howard M. Williams of the office of Chief of Engineers, and Carl F. Izzard, highway engineer, Public Roads

SPREADS FORWARD AND BACKWARD

Fast Non-Stop Spreading

- Spreads all materials to 1", wet or dry
- Spreads thick or thin
- Attaches to truck as tailgate
- Does not limit use of truck to spreading
- Controlled from cab with clutch
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- No helper required
- Stops spreading with truck in motion
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- Half or full width of street
- Reduces number trucks required
- Positive uniform spread
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New simplified construction, installation and maintenance, new ease of operation . . . but basically the same practical, economical, efficient Flink spreader that has proved itself in a thousand tough road construction and maintenance jobs . . . in ice control and dust control all over America. Write for complete information.

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STREET STRIPING AT 10,000 FEET PER HOUR!

Now — you can put street striping on a fast production basis with M-B Self-Propelled Marker. Because it operates at a constant speed, this efficient M-B machine produces a more uniform line . . . lays down more lines per hour . . . increases lineage per gallon of material used. No pushing necessary. Operator merely guides machine. Capacity, 10,000 feet per hour.

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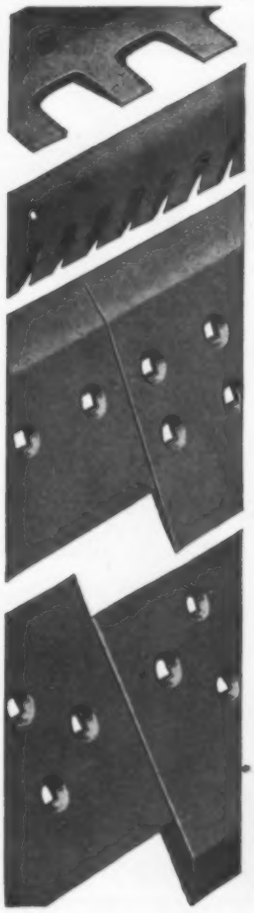
MB MARKERS



Shunk

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For any type or make of machine—Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls, Snow Plows, Also—
CUTTING EDGES, WEARING BOOTS, BACK SLOPERS, EXTENSION BLADES, MOLDBOARDS and SCARIFIER TEETH

50 years of specializing in the manufacture of Construction Equipment Blades has developed for your benefit a quality of special steel, milled through our own rolls and forged at the edges to give that extra cutting and wearing quality you need.

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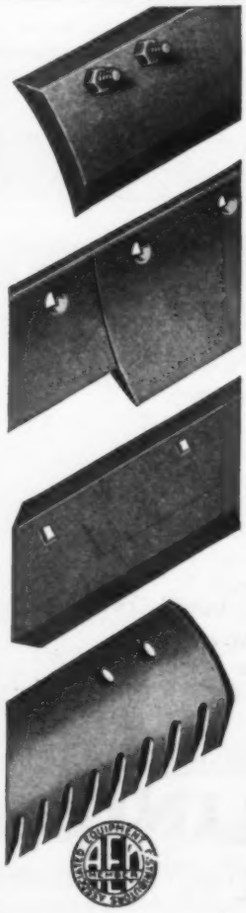

Administration.

Audience participation indicated the extreme interest in the subject of drainage and the urgent need of easily adaptable design formulae.

•

(*Continued from page* 99)

9. Cost of repainting of center-line traffic stripes indicates economy in the use of the broken center line in lieu of the continuous line. One state indicates a saving of 55%.

10. An analysis of maintenance expenditures over a period of years on representative sections of road discloses that on the average, 45% of the expenditures are made for direct labor, 21% for materials, 25% for equipment, and 9% for overhead.

•

Traffic Fatalities Increase — Traffic fatalities totaled 8,120 in the first 3 months of 1946, according to a report of National Safety Council. This is only 2% below that for the same period in 1941, and 44% greater for first three months of 1945. The council predicted that more than 38,000 persons would die in traffic accidents before end of the year.

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(*Continued from page* 87)

Engineers Participating

Latin American Engineers participating in the Inter-American Highway Training Program of ARBA are as follows:

ARGENTINA: Mark Kivilevich, 3601 Corrientes, Buenos Aires; Juan Jose Vistalli, 811 Rio Bamba Street, Buenos Aires.

BOLIVIA: Roger Marie de Barneville, Calle Campos No. 21, La Paz.

BRAZIL: Paulo Muller de Aguiar, Rua 15, de novembro, 526, Curitiba; Ricardo Mendes Goncalves, Rua Governador Pedro de Toledo 540, Campinos; Jose Maria Carre, D.A.E.R.—Sec. O. Publicas, Porto Alegre.

CHILE: Francisco Ramon Dick, Avda. Portugal 1847, Santiago; Jorge Ricardo Sierralta, Avda. Bolivar 5177, Santiago; Victor Contreras, Lincoyan 557, Concepcion.

COLOMBIA: David Moreno, Carrera 60 No. 68-192, Barranquilla.

COSTA RICA: Federico Baltodano, 341 3-5 St. 8 Av., San Jose.

CUBA: Juan Ignacio Planas, Steinhart No. 252 corner Robau, Marianao.

ECUADOR: Miguel Salem, 136 Febres Cordero, Guayaquil.

HONDURAS: Rafael Alejandro Cervantes, San Marcos de Colon, Honduras.

MEXICO: Hector Pena, Direccion Nacional de Caminos, Ensenada; Gustavo Alejandro del Rio, Ave. 21 No. 265, S. P. de los Pinos, Mexico, D.F.

PANAMA: Rodolfo Florencio Alvarez, 5 Plaza 2 de Enero, Panama.

PERU: Jose Felix Ventocilla, Calle Contumaza 159, Lima.

EL SALVADOR: Geraldo Guillermo O'Byrne, Direccion Gral Carreteras, San Salvador.

URUGUAY: Luis Bancalari, Navarrete 533, Melo.

VENEZUELA: Rafael Recao, Este-14-No. 12, Caracas.

(*Continued from Page* 83)

33. Because of the loss in motor-vehicle development effort occasioned by the war, it is recommended that particular effort now be directed toward continued improvement in all elements of car design affecting safety, such as brakes, headlighting, driver vision, tires and rims, bumpers, and direction signals.

34. It is recommended that there be strict enforcement of laws concerning the use of lower beams from headlamps.

35. It is recommended that there be strict enforcement of laws regarding overloading of commercial vehicles.

36. It is recommended that the manufacturer's authorized gross vehicle weight be used as a basis for the registration of trucks to control overloading.

37. In the interest of improving uphill performance of commercial vehicles, it is recommended that stress be placed on the maintenance of proper relationships between the gross vehicle weight of trucks and combinations and the horsepower output of their engines.

38. Statutory periodic inspection of motor vehicles is recommended, since it is an essential part of a complete safety program. Such inspections preferably should be made in government-owned and operated stations, wherever practicable.

39. With further respect to motor-vehicle inspection, it is recommended that the procedure employed be based on the American Standard Code for the safety inspection of vehicles. Efforts to improve instrumentation for safety inspection work should be continued.

40. It is recommended that steps be taken to see that all car and truck dealers are equipped to give and promote adequate headlight service.

41. It is recommended that everything possible be done to make an increasing supply of tires available at the earliest possible moment so that badly worn, unsafe tires now in use can be replaced.

42. It is recommended that there be no provision for limitation of maximum speeds by the compulsory use of governors.

WITH THE MANUFACTURERS & DISTRIBUTORS

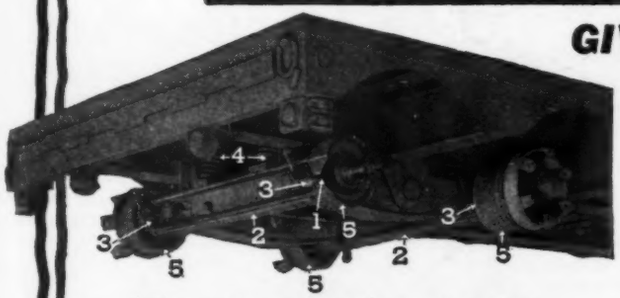
Myers Rejoins Davey

J. T. Myers

J. T. Myers has been appointed assistant general manager of Davey Compressor Co., Kent, O. A mechanical engineering graduate of Duke University, Mr. Myers has just been released from the Navy with rank of lieutenant. His service included acting as engineering officer aboard a minesweeper and later as an experimental engineer assigned to the Naval Academy, Annapolis. Mr. Myers first joined the Davey Compressor Co. in 1941.

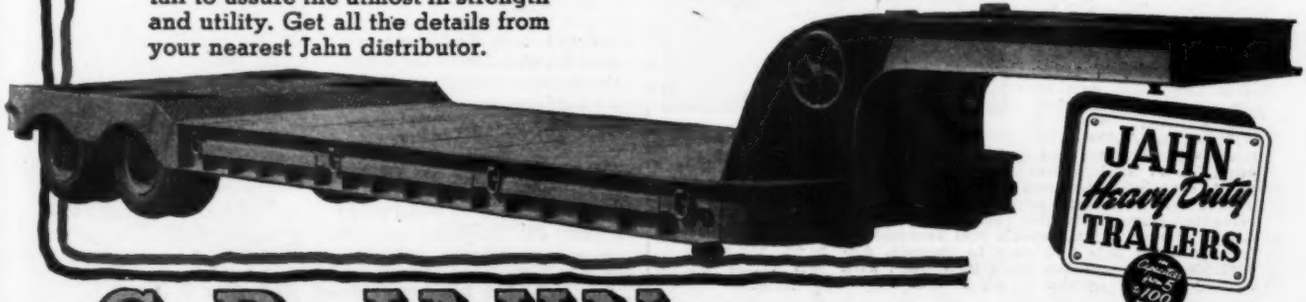
ONLY JAHN TANDEM AXLES

GIVE YOU ALL THESE FEATURES



The axle construction of a Jahn tandem axle, heavy-duty trailer is typical of attention given to every detail to assure the utmost in strength and utility. Get all the details from your nearest Jahn distributor.

1. Constant lift cam.
2. Two full-width axles attached to longitudinal rocker beams.
3. Worm gear type slack adjusters at each wheel.
4. Heavy coil springs at each axle.
5. Positive equalized braking at each wheel regardless of position of axle.



C. R. JAHN COMPANY

1341 W. 37th Place, Chicago 9, Ill.

"Come to Trailer Headquarters"

Carl Wold Retires

Carl O. Wold

Carl O. Wold, after 40 years of service to the construction industry, has retired. He was a vice president of Caterpillar Tractor Co. and had been executive head of Russell Grader Mfg. Co. prior to its acquisition by "Caterpillar" in 1928. Construction engineers hail Carl Wold as one of the pioneer builders of today's great earthmoving machinery industry. In his executive capacity with both Russell and "Caterpillar" it was he who guided the work of engineers and designers in producing machinery that helped revolutionize the entire industry. Mr. Wold was born on a farm near Rushford, Minn., and was educated at Rushford and at Stoughton Academy, Stoughton, Wis. From 1900 to 1906 he was affiliated with Dollenmayer Advertising Agency in Minneapolis and in February, 1906, was one of the incorporators of the Russell Grader Manufacturing Co., which became prominent in the manufacture and sale of road machinery. Throughout the existence of this company he was its executive head and when it was acquired by "Caterpillar" in 1928 he became a vice president of Caterpillar Tractor Co.

Marion's New Name

Announcement has been made by M. E. Montrose, president, of the change in name from the Marion Steam Shovel Co. to Marion Power Shovel Co., after stockholder approval at the annual meeting held in Marion, O., on April 1 and 2. All directors were reelected. This change in name, the first one since the company was founded more than 60 years ago, was desirable because the larger portion of production during the past 15 years has been Diesel, gasoline and electric powered machines and the new name more truly identifies the company with its products. The company has an extensive modernization and rehabilitation program under way involving the purchase of new machine tools and equipment. All officers were reelected at the recent annual meeting. They are E. G. Diefenbach, chairman of the board; M. E. Montrose, president and general manager; John M. Demarest, vice president and works manager; Alex Gibson, vice president and treasurer; John P. Courtright, vice president in charge of sales and service; Harvey T. Gracely, vice president; M. Virden, secretary and assistant treasurer; Walter C. Kraft, assistant secretary; Newton B. Schott, assistant secretary.

New Blaw-Knox Distributor

The Shaw Sales and Service Co., Los Angeles, Calif., has been appointed to represent the Blaw-Knox Company in the sale of the latter's complete line of construction equipment in Los Angeles and surrounding territory.

Peters New Sales Manager

John W. Peters, heretofore a sales representative of Brooks Equipment & Mfg. Co., Knoxville, Tenn., has been appointed acting sales manager succeeding R. S. Tucker, who has resigned. H. H. Houston, Jr., will be in charge of sales promotion for the manufacturing division of the company.

HERE'S EQUIPMENT FOR LOW COST SOIL-CEMENT BASE CONSTRUCTION

ARIENS AGGMIXER

BECAUSE the materials must be thoroughly mixed, Ariens AGGMIXER is the most important unit on soil-cement construction. The swirling, chopping action of the AGGMIXER tines is the best method known to do a thorough job of mixing—wet or dry. It is equipment especially designed for use wherever aggregates are used, such as all types of cements, clays, chlorides, bitumens, etc. It does a thorough job, rapidly and economically—and it is safe and easy to operate. Adjustable to any tractor. Made in 4 sizes, with normal cutting widths 4', 5', 6' and 7'.

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For complete information and job facts, together with the name of nearest distributor.

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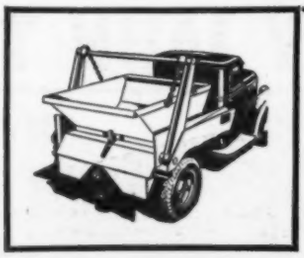

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Brooks LOAD LUGGER

insures greater economies

With TrucKrane Boom Attachment for handling and placing tile, sewer pipe, etc.

With Enclosed Type Container for handling refuse, waste, garbage, etc.

Counties and Communities *stretch* funds further by using the versatile LOAD LUGGER for handling road and construction materials, garbage, refuse and waste, wet or dry. Unit mounts on any standard chassis. Cuts loading, hauling and dumping costs . . . conserves trucks. Several bucket types.

Write for Bulletin No. 46

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Distributors in All Principal Cities

Brooks EQUIPMENT & MFG. CO.
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DO YOU OPERATE AN $18,000 BUCKET?

If you operate an $18,000 crane on *bucket work*, you most certainly operate an $18,000 bucket, for your entire crane investment during that period depends upon the efficiency of the bucket. We know a contractor who operated a used ½ yd. bucket when an analysis of the job and crane called for a ¾ yd. bucket. *In ordinary excavating work he lost 10 cu. ft. of pay load on every bucket cycle.* Do a little figuring or better yet, wire us collect the capacity of your crane, the boom length, and the material handled. We'll give you facts that will mean more profits on bucket work—help you get the most out of your crane investment on bucket work.

ERIE STEEL CONSTRUCTION CO.

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BUCKETS • AGGREMETERS • PORTABLE CONCRETE PLANTS

SAUERMAN

Long Range Machines

Slackline Cableway Is in a Class by Itself

Cableway Feeds Screening Plant from Deep Pit

Above picture shows a Sauerman Slackline Cableway mining a gravel deposit 90 ft. deep and 1,000 ft. wide and moving the material to a hopper on top of screening plant at a rate of 110 tons an hour. Operating cost is only a few cents a ton and machine handles all material within its radius.

WHEN you have a problem of moving almost any kind of material, from a deep pit, river or pond, to a hopper storage pile or other elevated point—there's nothing quite equal to a Sauerman Slackline Cableway.

This machine is digger, conveyor and elevator all in one. It utilizes a round bottom excavator bucket that has the same powerful digging action as the buckets used on revolving dragline excavators. The bucket is chain-suspended from a carrier running on an inclined track cable and is equipped with a simple dumping device which permits automatic dumping at any pre-determined point along the track cable.

After dumping its load, the empty bucket is carried by gravity back to the digging point. The track cable swings around a central mast or tower in a wide arc, the radius of which may be as much as 1200 ft., and the bucket digs and delivers wherever the operator wishes within the radius. Bucket sizes range from 1/3 to 3½ cu. yd. Electric, gasoline or Diesel power.

Ask for Catalog 19-C

SAUERMAN BROS., INC.

588 S. Clinton St., Chicago 7, Ill.

Alemite Promotions

Charles I. Kraus has been appointed sales manager of the Alemite distribution division of Stewart-Warner Corporation and Gustave Treffeisen has been named assistant sales manager. Mr. Kraus has been with Alemite since 1929. For several years prior to assuming his new post, he headed the industrial sales division. Mr. Treffeisen most recently in charge of automotive and farm sales, joined the corporation in 1920.

Named Sales Development Manager

C. E. Jones

Carroll E. Jones, formerly a major, Corps of Engineers, has been appointed sales development manager of Caterpillar Tractor Co., Peoria, Ill. He takes over the duties of Kenneth F. Park, recently named to the newly created post of engineering consultant on all matters pertaining to the earthmoving field. Mr. Jones is well known in the heavy machinery and contractors' industry, having served with county and state highway departments, the J. D. Adams Co., and International Harvester Co. both in domestic and foreign operations. During the war, Mr. Jones was assigned to the Peoria, Illinois, industrial area, charged with procuring "Caterpillar" Products for the Corps of Engineers.

Miller Named Manager

Ross Miller has been appointed manager of the Pacific Coast factory of Gar Wood Industries, Inc., in San Francisco. He joined Gar Wood Industries as a mechanic in 1920. He later became a foreman and was named manager of the company's Baltimore branch in 1932. Three years later, he became a salesman in the New York branch, and in 1936, was named Middle West district manager. After working as an expediter for the company, he was named national service manager in 1943.

New Davey Distributor

H. W. Lewis Equipment Co., San Antonio, Tex., has been distributor for southern Texas for the complete equipment line of Davey Compressor Co.

Sterling Buys High Speed Diesel Rights

The National Supply Co. of Pittsburgh and the Sterling Engine Co. of Buffalo have announced that the latter company has purchased the manufacturing and servicing rights to the high-speed diesel engines formerly produced at National's Superior Engine Division, Springfield, O. Production of the engines will be taken over by Sterling. Disposal of the company's rights to the high-speed diesels will permit National to expand its facilities for the production of slow-speed, heavy duty diesels.

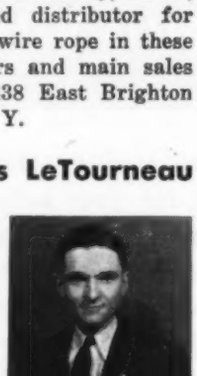
New Acquisition by C.I.T.

The installment portfolio of Credit Utility Co., Inc., has been acquired by C. I. T. Corporation and the latter has taken over the servicing of all former accounts of Credit Utility Co., Inc. All the facilities of C. I. T. will be placed at the disposal of Credit Utility Co. customers and accounts will be serviced through C. I. T. offices in New York, Chicago, San Francisco and Los Angeles. The C. I. T. Corporation specializes in financing installment sales in the machinery and construction equipment fields.

New Distributor for Wickwire Spencer

The Milton Hale Machinery Co., Inc., of Syracuse and Albany, N. Y., has been appointed distributor for Wickwire Spencer wire rope in these cities. Headquarters and main sales offices will be at 438 East Brighton Ave., Syracuse, N. Y.

Heiple Rejoins LeTourneau



D. K. Heiple

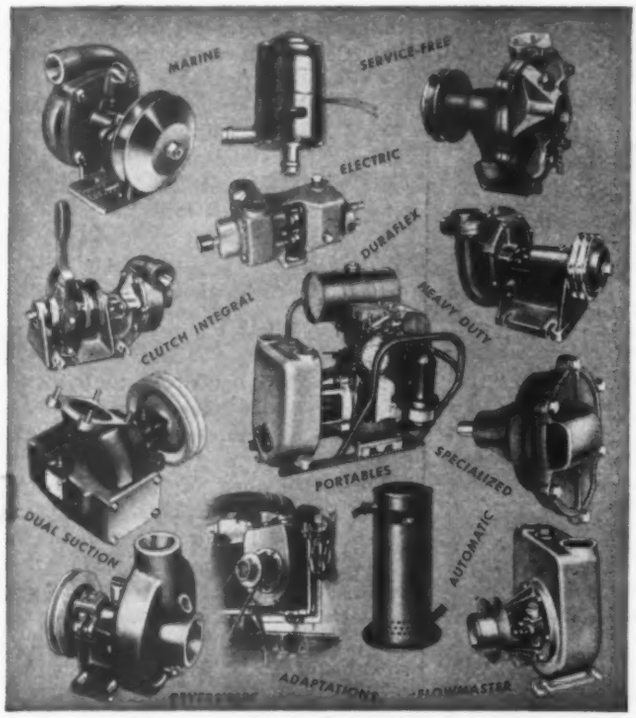
Dan K. Heiple, who recently returned to civilian life, has rejoined R. G. LeTourneau, Inc., Peoria, Ill., as a field engineer in the Installation Department. He went to work for LeTourneau in 1938. He was graduated from Purdue University in 1941, where he majored in mechanical and civil engineering. Since early in 1942 he served as officer in charge of service and maintenance of aircraft with the United States Navy. Part of this time he spent aboard the U.S.S. Enterprise in the South Pacific, the rest in service on both coasts of the United States.

Dickinson Joins Calcium Chloride Association

Lieutenant William E. Dickinson, veteran of four years service in the U. S. Navy, has joined the staff of the Calcium Chloride Association, Detroit, Mich., as civil engineer on technical service. He is a graduate of the Civil Engineering School of Ohio State University. After his university training, he served as an instrument man at a surveying camp working on a topographic survey of two proposed dam sites for the State of Ohio. Later, he obtained a job with a consulting engineer, Mr. Edison W. Ellis, in Van Wert, O. For eight months before being commissioned Ensign in the Navy, Mr. Dickinson was employed with the U. S. Engineers at Wright Field, Dayton, O,. where he was special assistant to the Chief of the Construction Division.

Solvay Opens New Branch

Solvay Sales Corporation has established a new office at No. 847 M. & M. Building, Houston, Tex. This new office, which will cover the states of Texas, New Mexico and Arizona, will be in charge of Col. S. O. Taylor.



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BITUMINOUS DISTRIBUTORS

ACCURATE... DEPENDABLE... ECONOMICAL

Reduce maintenance and operating expenses, cut labor costs, with dependable Etnyre "Black Toppers". Over 40 years of research, quality construction methods and materials insure accurate, economical performance. Get full details from your Etnyre dealer or write direct.

E. D. ETNYRE & CO., Oregon, Illinois

Euclid Appointments

The following are recent additions to the organization of The Euclid Road Machinery Co., Cleveland, O.: H. W. Hiscox has been appointed sales representative for Virginia and West Virginia and will assist the Export Department with Washington contacts. He was formerly with B. F. Goodrich Co. as district manager in the Southeast. Recently discharged from the armed forces where he served as Captain in the Air Corps, George M. Perry has joined the Export Department as assistant to P. H. Malenchini, Manager of the department. Thomas A. Cantrell, formerly a Major in the Engineer Corps, has been placed in charge of field engineering. He will study Euclid equipment in the field and will prepare data on operation and costs for use by Euclid distributors and owners.

New Sales Policy for LaPlant-Choate

In a recent week-long meeting at Cedar Rapids, Iowa, district sales representatives of LaPlant-Choate Manufacturing Co., Inc., were officially informed of the company's new sales policies by E. R. (Ed) Galvin, newly appointed executive vice-president and general sales manager. It was announced that immediate steps are being taken to establish a completely new world-wide LaPlant-Choate dealer sales and service organization, with a number of new dealers already appointed.

New Chief Engineer For Novo

Lee M. Corless has been appointed chief engineer for Novo Engine Co., Lansing, Mich. After graduating from Michigan State in 1930, Mr. Corless joined the engineering staff of the Chevrolet Division of General Motors Corporation in Detroit. While with Chevrolet, he specialized in experimental work in the development and testing of both passenger cars and trucks. In connection with these experimental duties, he spent three years at the General Motors Proving Grounds. On April 25, 1941, Mr. Corless was called to active duty in the Army as a 1st Lieutenant. He advanced rapidly in rank and on Jan. 3, 1946, was commissioned Colonel.

Gates Joins Ransome

G. E. Gates

Worthington Pump and Machinery Corporation, Harrison, N. J., has announced the appointment of Geo. E. Gates, for 15 years prominent in western construction equipment industry, as a staff member of the Worthington-Ransome Construction Equipment Division, with headquarters at San Francisco, Calif.

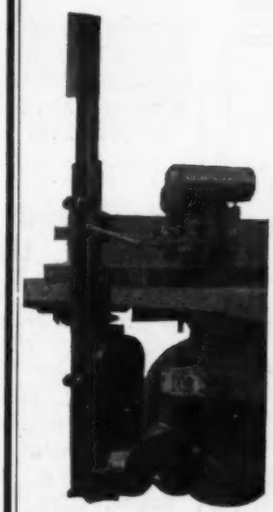
Promotions by Timken

Walter F. Green has been promoted to assistant manager of the Timken Roller Bearing Company's Division of Research and Development while Joseph M. Roshong has been named superintendent of the Division of Research and Development, company officials announced. Harley J. Urbach has been appointed works engineer, taking over the former duties of Mr. Green.

DOES the JOB FASTER — MICHIGAN Mobile SHOVEL MODEL T-6-K

FINGERTIP AIR CONTROLS
•
¾ YARD SHOVEL
•
6 TON CRANE

MICHIGAN POWER SHOVEL CO.
BENTON HARBOR, MICHIGAN



NOW THE MODERN SPENCER POWER DRIVEN STEEL POST DRIVER

Does the work of 8 men with only 2 men. THEY HAVE BEEN PROVEN IN THE FIELD. SEVERAL STATE HIGHWAY DEPTS. HAVE USED THEM THIS SEASON.

ALSO

COUNTY HIGHWAY DEPTS. HAVE USED THEM FOR TWO YEARS AND ARE ENTHUSIASTIC USERS.

Power take-off or Motor Driven.

Will drive 1,000 to 2,000 snow fence posts per day with only two men and with less labor than they would do it by hand. Simply load up the truck with posts and while they are being distributed, in very little more time they can be driven. Mounts on truck or tractor. Saves posts, trucks, labor, and time at the season when they all are so necessary. Write for full particulars and further information.

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all widths and plies
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HOSE
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• COMPLETELY WATER SOLUBLE
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Agricultural Chemicals and Hormones
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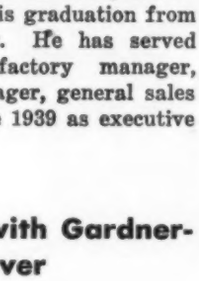
Meeker Elected President J. D. Adams

Howard R. Meeker, for 33 years a member of the Adams organization, was elected president of the J. D. Adams Manufacturing Co., Indianapolis, Ind., at the company's annual stockholders' meeting. He had served as executive vice-president since 1939, during which period Roy E. Adams served both as chairman of the board and as president. Mr. Adams retains the office of chairman of the board. Mr. Meeker entered the Adams organization as a member of the engineering department in 1913, immediately following his graduation from Purdue University. He has served successfully as factory manager, division sales manager, general sales manager, and since 1939 as executive vice-president.

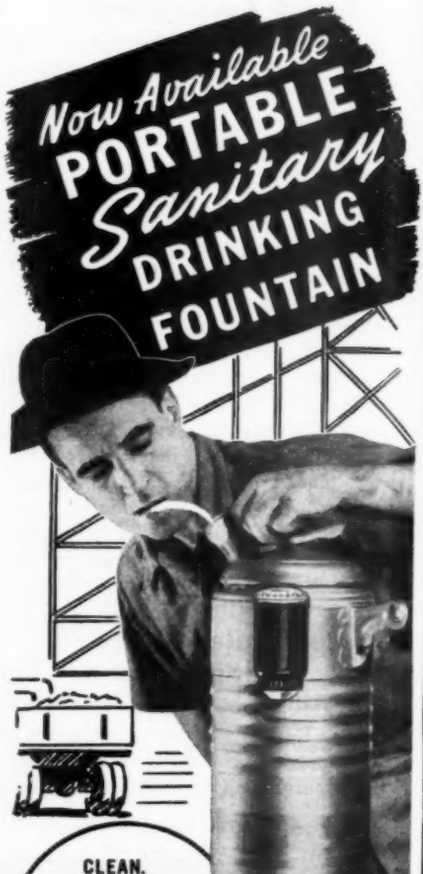
H. R. Meeker and Roy E. Adams

Spann Back with Gardner-Denver



B. P. Spann

B. P. Spann has returned to his position with Gardner - Denver Co., Quincy, Ill., as advertising manager after 38 months in the Navy. Mr. Spann, who has been with the Gardner - Denver Company since 1934, was granted a leave of absence in November, 1942, to enter the Navy. Stationed at the Aviation Supply Office in Philadelphia, he was Officer in charge of Maintenance and Overhaul Spare Parts for all Navy transport aircraft. His duties took him into nearly all the principal cities of the United States and Canada, and a portion of Alaska. When he was discharged, Mr. Spann had the rank of Lieutenant Commander, having risen from the rank of Lieutenant (j.g.).



STOP GERM SPREADING PRACTICES!

Eliminate the use of unsanitary pails, kegs, dippers or cups, and protect the health and strength of your workmen on jobs where *fresh*, *clean* and *cool* drinking water is not permanently available . . . Save payroll losses by keeping your men on the job! The Dobbins Portable Drinking Fountain does all this by providing protection from disease, colds, etc., which may otherwise be spread with the use of a "common" drinking cup or dipper. Inner water container and bubbler parts made of corrosion-proof stainless steel or plated brass. Fully insulated to keep water *fresh* and *cool*. Four gallon capacity. A few strokes with the pump supplies compressed air for instant flow of water at the press of a button. Meets requirements of Public Health Authorities!

ORDER DIRECT FROM FACTORY—IMMEDIATE DELIVERY

No. 18—*Dobbins Superbilt Portable Drinking Fountain*, less carrying strap and salt dispenser, **Only $12.50**
Salt Tablet Dispenser, 500 tablet capacity, extra **$2.75**
Adjustable, Waterproof Carrying Strap, extra . . **$1.00**
Spill Cup, to catch overflow when used indoors . . **$3.50**
Mounting Bracket, holds fountain to wall or floor of buildings, trucks, tractors, locomotive cabs, etc. **$4.50**

All prices F.O.B. Elkhart, Indiana. Circular on request.

DOBBINS MANUFACTURING COMPANY
Dept. 522, Elkhart, Indiana

Dobbins Superbilt PORTABLE DRINKING FOUNTAIN

PLUS VALUES IN HEAVY DUTY TRAILERS
Rogers Brothers, pioneer developers of heavy duty trailers, built millions of dollars worth of military trailers during the war and now offer their complete line of advanced equipment for all regular needs.
ROGERS
HEAVY DUTY
Gooseneck Trailers
EXPERIENCE builds 'em
PERFORMANCE sells 'em
ROGERS BROTHERS CORPORATION
110 ORCHARD ST. • ALBION, PA.

Ceco Changes

Ralph K. Alexander, until recently district sales manager for Ceco Steel Products Corporation at Oklahoma City, Okla., has been appointed the firm's Texas manager with headquarters in Houston. He replaces Russell L. Jolley. William A. Smith, assistant manager at Washington, D. C., has been named assistant to Mr. Alexander. Ceco recently purchased eight acres of land in Houston and plans to erect a new plant in the near future for the fabrication of reinforcing bars, steelforms and steel joists. Meanwhile, Ceco's present plant at 2814 Pease Ave., Houston, will continue to serve the building industry in the Houston territory.

New Sauerman Distributors

Sauerman Bros., Inc., Chicago, Ill., manufacturers of scraper and cableway equipment, have announced the following new distributor appointments: Intermountain Equipment Co., Boise, Idaho; Robison Machinery Co., Salt Lake City, Utah; Highway Equipment Co., Cincinnati, O.; Jeff Hunt Machinery Co., Columbia, S. C.; Constructors Equipment Co., Denver, Colo.

Old Employees Control Penn Co.

Following the untimely passing of Hamilton O. Penn, the controlling interests of the H. O. Penn Machinery Co., Inc., New York, Poughkeepsie, Mineola, N. Y., and Newington, Conn., have been acquired equally by Ralph L. Johnson and Stuart A. Wade, both of whom have been with the company for more than a decade. The changes

S. A. Wade

R. L. Johnson

in the official staff are: President, Ralph L. Johnson; Executive Vice-President and General Manager, Stuart A. Wade; while the other officers remain the same, namely, Secretary, Horace C. Ruggles and Treasurer, Harriet Plotkin. Mr. Johnson is a graduate of the School of Mines, University of Minnesota, and spent several years selling heavy machinery in the eastern part of the United States before joining the Penn organization some twelve years ago. After outstanding work as a sales engineer, he became sales manager, secretary and then vice president of the company, which he now heads. Stuart A. Wade, after completing college in 1914, became associated with the Belmont Iron Works of Philadelphia; served with the 7th Regiment in World War I and then went into the steel erection business in New York City. He was responsible for much of the steel work in the New York Subway System. About 10 years ago he joined the H. O. Penn Machinery Co., and his work as a sales manager in New York City, Westchester and Rockland Counties soon lead to his appointment as second vice president.

Hydreco Announces Director

Hydraulic Equipment Co., Cleveland, O., has announced the election of Herbert P. Ladds, President of National Screw & Mfg. Co., and the Cleveland Chamber of Commerce, to its Board of Directors. Mr. Ladds fills the vacancy caused by the sudden death of Horace B. Keeler last fall.

OWEN
CLAMSHELL BUCKETS
INSURE A BIGGER DAYS WORK
A MOUTHFUL at EVERY BITE
This is not only the claim of OWEN, the name symbolic of the highest grade Excavating and Handling Buckets for years. — Operators everywhere, "on and off" the job, volunteer this testimony.
And — there's a reason. Owen-engineered buckets incorporate special features which have been continually improved.
Branches: NEW YORK PHILADELPHIA
THE OWEN BUCKET CO.
Breakwater Ave. • Cleveland, Ohio
CHICAGO BERKELEY, CAL.
and MORE BITES PER DAY

CLEARING HOUSE

FOR SALE

New Blaw-Knox Concrete Paving Spreader. 20-22 feet adjustable. Bargain.

MATT A. DOETSCH MACHINERY CO.
428 Bond Building, Washington 5, D. C.

FOR SALE

Lakewood Type (F) Finisher with Lerel Gas Engine, cost $2,615, used once, excellent condition, $1,000 takes it.

Also 16' Adjustable 18' Lakewood Steel Sub-Grader cost $1,025, used once, excellent condition, $400.00 takes it.

WM. M. CHASE
15 Linwood Ave., Buffalo, N. Y.

WANTED: Nationally known manufacturer of concrete products wants Chemical Engineer for development of air entraining admixtures, waterproofings, and curing agents. Good opportunity for man with initiative and ambition. Write, giving full details as to experience and salary expected.

P. O. Box No. 106, Roads & Streets,
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FOR SALE
(Subject to prior sale)

Koehring 27E Paver. Serial No. 16409, first class working order. Has new Drum as stand-by.

Flexible Road Joint Finishing Machine, 18 feet to 25 feet, with double screed.

Quantity of 8 and 9 inch Steel Forms.

6 inch Rex Pumpcrete.

Two Buffalo 8-10 Ton Tandem Rollers.

Location: El Paso, Texas.

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FOR SALE

Late model BROOKS LOAD Luggers, CH-200, including 2 cu. yd. buckets, $750.00;

Late model DEMPSTER DUMPSTERS, LF-200, including 1½ cu. yd. and 2 cu. yd. buckets, $500.00;

Portable Iowa R.B. 12" x 20" Crushing Plant, 60 H.P. engine, folding type elevator. Like new, $2,600.00.

M. Wenzel, 2136 Jefferson, Kansas City, Mo.

FOR SALE

1—Foote Paver	$3,000.00
1—Huber Roller, Gas, 10-ton—3-wheel	1,250.00
3—Steam Tandem Rollers (Prices vary	
1—Barber Asphalt Plant, 2,000 lb. box	1,500.00
1—Acme Stone Crusher, screens and elevator equipped with McCormick-Deering power unit	1,200.00
1—Barber-Greene Ditcher	2,500.00
2—Drott Universal Bull Clam Shovels (New), each	500.00
1—Buckeye Sub Grader, 10' to 12'	3,250.00
1—McCormick-Derring Power Unit, 40 H.P., gas, in perfect condition	500.00

PHIL H. McQUIRE
P. O. Box 34, Norfolk, Va.

Try a **Pierce·Bear** *on that tough job!*

3½-5 TON — VARIABLE WEIGHTS

Engineered refinements and rugged strength have earned for these rollers enviable performance records. Compact design gives efficient operation in close quarters. Ideal for maintenance work on highways, airports and parking areas. Fine for driveways, docks, etc. Easy to operate. They do a good job at low cost.

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SAN ANTONIO 6 TEXAS

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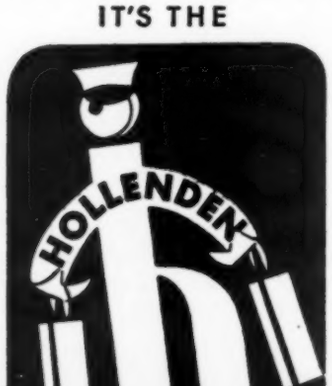
IT'S THE



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VOGUE ROOM
1000 ROOMS WITH BATH
RADIO IN EVERY ROOM
FIVE FINE RESTAURANTS
CENTRAL DOWNTOWN LOCATION

ASPHALT and TAR KETTLES
FIRE PROOF—OIL BURNING
Hand and Motor driven spray.
Many sizes. Write for catalog.

Elkhart White Mfg. Co. **Indiana**

VULCAN PAVEMENT AND CLAY DIGGING TOOLS

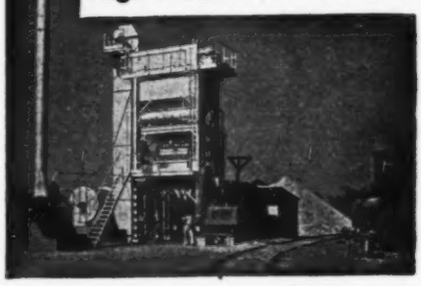
ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

Send for NEW Vulcan illustrated CATALOG today.

VULCAN TOOLS — THE WORLD OVER — NOTED FOR QUALITY AND DURABILITY"

VULCAN TOOL MFG. CO.
QUINCY, MASS.

PORTABLE ASPHALT PLANTS
High Production—Low Cost



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● Up to 2000 Tons a Day ●

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GUTTER-SNIPE
PICK-UP STREET SWEEPERS

STREET FLUSHERS
STREET SPRINKLERS
BITUMINOUS DISTRIBUTORS
BITUMINOUS MAINTENANCE UNITS

Since 1908

MUNICIPAL SUPPLY COMPANY - SOUTH BEND 23, INDIANA

Joins Consolidated Diesel

S. E. Halliday

Stuart E. Halliday who for the past nine years has been connected with the Novacal Chemical Co. as a salesman and sales manager has joined Consolidated Diesel Electric Corp., New York City, to supervise sales and advertising. He has had wide and varied experience in merchandising.

On March 1st, Consolidated Diesel Electric Corp. moved to their new plant at 230 East 8th St., Mount Vernon, N. Y. They will retain their branch offices in Chicago and Washington, D. C.

New Davey Distributors

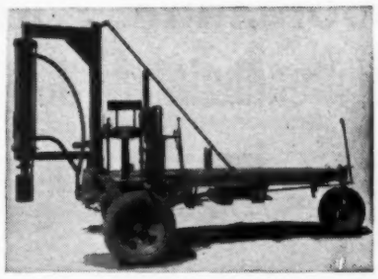
New dealership appointments have been announced by Davey Compresser Co., Kent, O., as follows: C. A. Lippincott & Bro. Co., 3rd and Union Sts., Morristown, N. J.; Jones-Rogers Co., 418 Schofield Bldg., Cleveland, O.; The Phillips Machy. Co., 900 E. Cary St., Richmond, Va.; Phillips Machy. & Tractor Co., 325 W. 23rd St., Baltimore, Md.; Phillips Machy. & Tractor Co., P. O. Box 549, Alexandria, Va.

Park Promoted by "Caterpillar"

K. F. Park

Kenneth F. Park, heretofore sales development manager of Caterpillar Tractor Co., Peoria, Ill., has been advanced to the newly-created post of engineering consultant on all matters pertaining to the earth-moving field. In his new position he will serve "Caterpillar's" three sales divisions and will be able to devote full attention to earth-moving machinery developments. Mr. Park has had extensive experience in the engineering and construction fields. He joined R. G. LeTourneau, Inc., in 1933 as chief field engineer after several major assignments as engineer and superintendent for large western contracting companies, and came to "Caterpillar" in January, 1944, to take charge of sales development.

RAPID!



Cuts concrete and cuts labor costs to 2½c per square yard. Applicable to floor work and different types of inside horizontal work.

Very efficient in maintenance work of highways.

Boom folds down and readily trailed by any light truck. Make your compressor treble its output by hooking it to this machine.

Rapid Pavement Breaker Co.
1517 Santa Fe Ave.
Los Angeles 21, Calif.

THAW CULVERTS and HYDRANTS with an AEROIL

No. 98 Portable Steam Thawer

A handy steam plant with a detachable thawing torch. Used by leading Highway Departments for Culvert Thawing. Special Culvert Nozzle (10 ft.) available. Send for WINTER CATALOG No. 234-S including Concrete Heaters, Portable Coil Water Heaters, Thawing Torches, Ground Thawers, Salamanders, Tar and Asphalt Heaters, etc.

AEROIL PRODUCTS CO., INC.
5717 PARK AVE. WEST NEW YORK, N. J.
Branches: Chicago, San Francisco, Dallas

Tyger New Sales Manager

J. C. Tyger has been appointed sales manager of the Dredge and Pump Division of American Steel Dredge Co., Inc., Fort Wayne, Ind. He was formerly mid-west manager for Allen-Sherman-Hoff Co., Inc., Philadelphia, and has been connected with the dredging and material flotation industries for many years. The Dredge and Pump Division is located at the Chicago office of the American Steel Dredge Co., recently opened at 134 North La Salle St., in charge of Mr. Tyger.

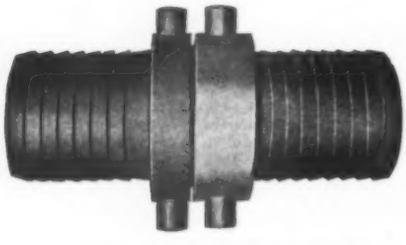
SAFE, DURABLE COUPLINGS... for All Roadbuilding Jobs

"G J-BOSS"
GROUND JOINT FEMALE
HOSE COUPLING, STYLE X-34

For high or low pressure steam, air or liquid hose. Washerless, leakproof construction. "Boss" Offset and Interlocking Clamp anchors coupling to hose with powerful, full-circumference grip, without pinching. Sizes, ⅜" to 4", inclusive.

"G J-BOSS" GROUND JOINT
AIR HAMMER COUPLING

Strong, durable, leakproof. No washers to replace—no danger of blow-offs. Furnished with tight-gripping "Boss" Interlocking Clamp. Compact Type, Style XLB-61, ½" and ¾". Heavy Type, Style XHB-72, ¾" and 1".



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For Suction and Water Hose

A husky coupling that is quickly connected and disconnected. Made in all malleable iron; malleable iron with brass nut; or all brass. Uniform in quality, threading and dimensions. Shanks have deep, clean corrugations. Sizes, 1¼" to 8", inclusive.

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Strand-Laid? Cable-Laid? Braided?

American Cable has a wider range of sling types than any other manufacturer. Here you can get the exact type of sling best suited to your job. Whether the conventional strand-laid sling, the cable-laid sling, or braided slings made up in 4, 6 and 8 parts, American Cable engineers hold no brief except for the one that will do your job best. And in wire rope endings, too, American Cable takes the lead with the new, 100% efficient ACCO-LOC Safety Splice and the swaged U-LOC. More than this, you may have your American Cable slings proof-tested and registered for known strength and safety. Here again is another sling service that is exclusive with American Chain & Cable. You cannot buy a better sling than an ACCO-Registered sling — made of TRU-LAY Preformed Wire Rope of Improved Plow Steel.

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AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

These road builders are far apart geographically

but united in their choice of Texaco Asphalt

An Illinois road builder resurfaces a State Highway with Texaco.

A Massachusetts road builder constructs airport runways with Texaco.

A Colorado road builder gives a secondary road a low-cost Texaco surface.

Look around the country and observe America's road builders at work—

One is building the runway system of a modern airport—another is constructing a section of state highway—a third is paving the principal street of a progressive city.

Note the impressive number of these road builders who have chosen Texaco Asphaltic products for their projects. The types of Texaco construction on which they are working include heavy-duty pavements of the plant-mixed or penetration macadam type, low-cost asphalt surfaces of the road-mix or plant-mix type, and single or double surface treatments.

Texaco Asphalt Cements, Cutback Asphalt and Slow-curing Asphaltic Oils are available to road builders everywhere east of the Rockies. Texaco engineers, who are Asphalt specialists, are at your service. Write our nearest office.

A Texas road builder paves an important city street with Texaco.

A Virginia road builder surfaces treats a town road with Texaco.

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TEXACO

REG. T. M.

TEXACO ASPHALT